

Railway Maintenance Engineer

Volume 15

June 1919

Number 6

(With which is incorporated the Engineering and Maintenance of Way Edition of the *Railway Age Gazette* and *Railway Engineering and Maintenance of Way*.)

Published on the last Thursday preceding the date of issue by the
SIMMONS-BOARDMAN PUBLISHING CO.,
TRANSPORTATION BUILDING, CHICAGO, ILL.

NEW YORK: WOOLWORTH BLDG. CLEVELAND: CITIZENS' BLDG.
LONDON: 85 FLEET ST. E. C. 4. CINCINNATI: 1ST NATIONAL BANK BLDG.
WASHINGTON: HOME LIFE BUILDING.

EDWARD A. SIMMONS, President. HENRY LEE, Vice-President and Treas.
LUCIUS B. SHERMAN, Vice-President. R. V. WRIGHT, Secretary.

ELMER T. HOWSON, Editor.
WALTER S. LACHER, Managing Editor. JOHN G. LITTLE, Associate Editor.

Entered at the Post Office at Chicago, Ill., as mail matter of the second class.

Subscription price, \$2.00; foreign countries, \$2.50.
Subscription Agents for Great Britain and Egypt: Dorland Agency, Ltd., 16 Regent Street, London, S. W. 1.

WE GUARANTEE, that of this issue 8,100 copies were printed; that of these 8,100 copies, 7,299 were mailed to regular paid subscribers, 70 were mailed to advertisers, 21 were mailed to employees and correspondents, and 710 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 46,420, an average of 7,737 copies a month.

The *Railway Maintenance Engineer* is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

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NEW BRANCH OFFICES

THE Simmons-Boardman Publishing Company, publisher of the *Railway Maintenance Engineer*, has opened a European office at 85 Fleet street, London, E. C. 4., England, in charge of Robert E. Thayer, European editor, who has been a member of our editorial staff for the past eight years. Mr. Thayer will be the European representative of the Simmons-Boardman publications, including the *Railway Maintenance Engineer*, the *Railway Age*, the *Railway Mechanical Engineer*, the *Railway Signal Engineer* and the *Railway Electrical Engineer*, and will contribute regularly to the columns of these papers. This arrangement will afford the *Railway Maintenance Engineer* an opportunity for covering foreign railway fields in a much more advantageous manner than in the past.

The Simmons-Boardman Publishing Company has also opened an office in the First National Bank building, Cincinnati, Ohio, in charge of R. H. Smith, who has been a member of the business staff for several years, connected with the Chicago office. Mr. Smith will look after the interests of the Simmons-Boardman publications in that vicinity.

A contrast of ideas is presented in the discussions appearing on another page relative to the advisability of picking up low spots as compared with surfacing tracks continuously in the spring. This variance is not alone in ideas; it is born largely of differences in experience. As in

A Contrast of Ideas

many problems of track work, the answer to a question on a high speed main track, well ballasted and laid with heavy rail, may be entirely different from that on a track of lighter construction but equally well adapted for its traffic. Thus, while low spots will develop in any track carrying traffic, the character of attention which they demand when they develop depends upon the importance and density of the traffic passing over them and the manner of construction of the track itself. On the heavily ballasted lines in the East, a degree of surface is maintained which would not be justified in the West. Therefore, it is a justifiable practice to surface such tracks out of face more frequently to remove minor inequalities than in the West.

This is the day of the moving picture. It is rapidly monopolizing the field of entertainment and it has already become a mighty educational force. Industries are rapidly awakening to its possibilities in general promotional work as well as educational work among their employees. The railways have utilized it to carry the safety message. They have now, however, extended its use far beyond this.

The Movie in Track Work

One recent development has been the use of motion pictures by the Northern Pacific as a means for instructing its firemen in the proper methods of firing a locomotive. If the movie can be used successfully for such a purpose, and the results secured here indicate that it can, it would appear to be but a short step to introduce it in track work. Many details such as the renewal and tamping of ties are performed so many thousands of times and in such a variety of ways that education as to the most efficient of methods would appear to show possibilities of large savings, while such operations should lend themselves readily to treatment in pictures. One has only to observe the wide discrepancy in costs for the same operation in different gangs to demonstrate the need for educational methods regarding even the simpler problems of maintenance work.

SAVE THE GOOD

THE GENUINE ALARM which existed a short time ago relative to the tie situation is disappearing rapidly as the great increase in deliveries becomes known. Many conditions contributed to the marked reduction in production last year, not the least of which was the more or less radical innovations introduced by the Railroad Administration. The elimination of competitive buying, the issuance of uniform specifications, the fixing of standard prices, the elimination from the standards of small ties previously accepted and similar measures would very naturally tend to disturb the tie producing industry at any time. When it was added to the demoralization common to all fields of activity last year, it is not surprising that there are some who criticize the Administration.

Not all of the measures inaugurated have been practical or well advised. However, many of them have been highly constructive and should be retained after the roads have been returned to private control. Can this be done or will the stress of competition lead to the return to old practices? It is to be hoped that some plan will be developed whereby such constructive developments as the standard specifications can be maintained.

DOING MAINTENANCE WORK BY CONTRACT

SOME YEARS AGO, when the differential between the wages of railway track laborers and those of common laborers in other lines of work first became a real obstacle to the efficient conduct of track maintenance, several of the roads tried the experiment of contracting certain classes of work. While the roads pursuing this plan contended that it had proved successful for such work as ballast raises, few other roads adopted it. During the more stringent labor shortages of the past season, the contracting of maintenance work received a new impetus, but from such information has been brought to light it does not seem that the system under which the work was done would be warranted under any except the extreme conditions then prevailing. A letter to the editor in a following column explains some of the difficulties and suggests a form of contract designed to eliminate some of the more serious objections.

The increased cost and growing inefficiency of track labor suggests possible economies to be obtained by assigning some of the work to contractors who are subject to less restrictions in the hiring of men and the fixing of wage rates. However, there are two very definite obstacles to the success of this plan. The first of these lies in the fact that the quality of track work must be judged in the doing rather than in the appearance of the finished work. Hence, the drawing of specifications for workmanship that would insure the desired quality of result is difficult if not impossible. The second difficulty arises from the potential hazard to traffic incident to any

disturbance of the track structure. This applies as much to bridge maintenance as to track maintenance and imposes a system of supervision on any contract work which amounts practically to superintendence of the work by a representative of the railroad.

The term, maintenance of way and structures implies, in a general sense, the performance of operations, most of which are repeated from year to year, or even from week to week, on all the railroads in the country. Consequently, the work to be done is of a nature for which the railroads can organize forces that can be maintained on just as permanent a basis as would be possible for any outside contractor. In view of this any tendency for railway officers to favor the contract system would seem, in the absence of exceptional circumstances, to constitute an admission on their part that someone else could do the work better than they.

"SYSTEM" IN WATER SOFTENING

THE ADVANTAGE of water softening is an established fact. Demonstrations of the economy of water treatment or, to put it more directly, the large returns to be obtained from a properly considered investment in water softening facilities, have been brought to light so frequently that they attract little attention. However, it is not often that published demonstrations are presented in such a conclusive manner as in the article appearing on page 196 recording the year's results on the Missouri Pacific. The lesson to be learned from this is that success is largely the result of efficiency in operation through close attention to details. While not among the very earliest roads to take up water softening in the Middle West, the Missouri Pacific has had water treating plants in use for a sufficient number of years to develop an organization thoroughly trained in the operation and maintenance of the plants.

It has also provided an effective system of mechanical and chemical supervision. This not only insures that the water will be treated properly, but also that emergency conditions, such as will develop on any system using water from a great number of different sources, will be speedily and correctly analyzed and as promptly rectified. By correcting these objectional conditions as they arise, the water treating system is enabled to continue in effective service while the water treatment is not held responsible for a great many faulty conditions for which it is in no way to blame.

HIGH WAGES ARE HERE TO STAY

EMLOYERS ARE RAPIDLY coming to the conclusion that wage rates will not decline to any marked degree, at least in the near future. General agreement in this point is replacing the earlier thought, based largely on hope, that the era of high wages was to be temporary and would disappear soon after the conclusion of the war. The change in this attitude is being forced by a realization of the fact that the maintenance of high wages is the logical result of a number of conditions.

In the first place it is always difficult to take away from labor any advantage which it has already gained, even if general conditions are favorable for such a step and such conditions do not exist now. Also wages are closely related to the cost of living and this has shown no tendency to decrease so far. In fact, those changes which have taken place have been upward and the end does not appear to be in sight. Also while there is now a surplus of labor in most communities it is not as large as is generally thought and is being reduced by the departure of many foreigners for their native countries. The margin between the present surplus and the shortage is so small that when the universally expected era of re-

construction arrives, this margin will be wiped out quickly.

Another influence which must be considered is that of the present strength of organized labor. This movement has never received as great an incentive for its development in railway service as during the past year and a half of government control. Not only have no obstacles been placed in its way, but it has received much encouragement in its expansion. For the first time the labor movement has been able to make any marked progress in the maintenance of way department.

All of these activities will tend strongly to maintain present wage levels. Confronted by the prospect of a continuance of high labor rates a maintenance officer is facing a serious problem in endeavoring to reduce the cost of his work to a pre-war basis. He has two primary alternatives at his command: (1) the substitution of labor saving equipment wherever possible in order that he may require the minimum amount of labor, and (2) the development of as high a degree of efficiency as possible in the men which are employed.

The importance of labor saving equipment needs little emphasis today other than to point out the fact that the comparisons of a year of two ago are no longer applicable and that each rise in wages makes new comparisons more definitely in favor of mechanical equipment. There is no avenue which offers a more direct or ready return on the expenditure at the present time than this and railway men can reduce the cost of their work in no way more directly than by utilizing the equipment now available wherever conditions justify and by co-operating in the development of still other equipment to meet needs now unfilled.

Looking to the other source of relief, although a large employer of labor, the maintenance of way department should not be interested primarily in low wage rates in themselves. One of the greatest handicaps under which this department has labored in the past has been the almost universal practice of the managements of paying the lowest market rates, in return for which they secured only those men left after the other industries had taken their pick. While cheap at first cost, such labor has been highly expensive in the end. Now that the rates in this branch of railway service have been doubled in the last two years, it is possible for the roads in most localities outside of the large industrial centers to compete successfully with other industries for men and to secure a fairly efficient class of employees if the proper effort is made. Local officers have been so long accustomed to hiring the first man available, that many have not yet realized the change which has come about and are not utilizing the present advantage of the higher wage rates to the fullest extent. By exercising this choice as opportunity offers, they can do much to raise the standards of their forces. It has long been maintained that the efficient man receiving a wage above the minimum market rate will show a greater output of work per dollar expended than one receiving less. The railways have been slower than the industries to realize this and they have suffered as a result. This handicap has now largely been removed and maintenance officers owe it to the roads which employed them to take every advantage of the occasion.

If the maintenance department can so re-arrange its methods of work as to reduce the amount of labor required to the minimum by the substitution of mechanical for manual methods and can then raise the efficiency of the men employed to a higher level than has heretofore existed, much will have been done to overcome the increased costs brought about by the higher wage rates and it is even possible that these higher wages will prove of permanent benefit in the conduct of maintenance work.

LETTERS TO THE EDITOR

A SUGGESTED FORM OF CONTRACT

East Buffalo, N. Y.

TO THE EDITOR:

The writer is not an enthusiast in regard to handling railroad maintenance work by contract when it can just as well be taken care of by company forces. Frequently economies are claimed for work done in this way, which, if all the facts were available, would prove to be only a paper showing. While it is true that results can be obtained in this way if efficient and thorough inspection is provided, savings are often claimed for contracted maintenance work which are purely fictitious and are based on a low first cost without due consideration being given to workmanship and the lasting qualities of the work.

Last year the railroads were confronted with a serious labor situation in the maintenance department, owing to the fact that the rates of pay were rigidly fixed at a level considerably below that being paid by other industries. In the steel centers or near the big manufacturing and shipping cities of the east, when other industries were paying from 35 to 50 cents an hour for common labor, it was not reasonable to expect to hold or build up track forces when paying from 20 to 23 cents an hour.

In order to get around this situation, a number of roads resorted to the expedient of securing labor for maintenance work by force account contracts. The results were wasteful and extravagant, to say the least, and can hardly be justified even under the stress of war conditions. To pay a contractor from 10 to 12 per cent on his payroll plus workmen's compensation and liability insurance, merely for securing men (for that was all it amounted to) was certainly fine—for the contractor. In most cases, the services he rendered were only those of a labor agent. But the waste and expense involved did not stop there. The contractors in most cases, insisted on furnishing foremen at \$5 to \$6 a day, very few of whom, in the writer's experience, had a working knowledge of track work, so that the railroad was compelled to detail one of its own foremen to stay with each contract gang in order to keep the work going. The railroad's foreman had little or no influence over the men as regards production, since it was to the interest of the contractor to prolong the work; the longer it took the greater his profit; and his foremen, so called, in most cases interfered with and nullified the efforts of the railroad's man.

Right here I want to emphasize the necessity of exercising care in writing up force account contracts. No one will question the necessity of carefully specifying all conditions or contingencies in connection with a fixed sum contract, but it seems to have been assumed that because the railroad footed all the bills on the force account basis, it was unnecessary to be over explicit in drawing up such a contract. If you hired an automobile at a rental of \$4 an hour you would be indignant if the garage man charged you \$4.40, but contractors are human, and if the force account contract or agreement ambiguously specifies that the contractor's profit shall be 10 per cent, he is very apt to figure this on the agreed per diem rental of steam shovels, concrete mixers, etc., as well as on the payroll. and if nothing is specified regarding the condition and cost of repairs to machinery furnished by him, one should not be surprised when he brings an old worn-out shovel or concrete mixer on the job and proceeds to renew it piece by piece, until he has practically a new machine, and includes the cost of all of the new parts in his monthly bills. That such contracts as this are met with is doubt-

less due to the fact that the duty of drawing them up is left to some inexperienced clerk in the office of a general officer. They are of sufficient importance to warrant being made up by a competent engineer, preferably one who has had experience as a division engineer, and should be thoroughly examined and passed upon by the legal department.

Of course, it will be objected that under the stress of war through which we have just passed no contractor could be induced to take work on the lump sum or unit cost basis when he could keep all the men busy he could secure on profitable force account work. However, the writer's observation was that the force account basis was objectionable to a great many of the better class of contractors and the unwillingness of these men during the past few months to take work on any other basis was not so much the ease with which they could secure work on force account as their fear of getting caught by the uncertainties of rising material and labor costs on any other form of contract.

As a matter of fact, contracting work on the lump sum or unit cost basis is in many ways almost as unsatisfactory as the force account system. If, as pointed out above, the inspection is inefficient, the quality of the work is bound to suffer. While some contractors have competent engineering and accounting organizations which enable them to bid intelligently and with a fair margin of profit, this is more often not the case. On the one hand, the bids may be conservatively high in order to cover all possible contingencies, and, on the other, the contractor may make a wild guess and take work for less than cost; if he is strong financially he may finish the job and the railroad is the gainer, but the chances are he will throw it up and the bond guaranteeing completion will not always compensate the railroad for the additional cost of re-advertising the work or completing it with company forces.

As an alternative, it is proposed to retain and combine the good features of both the force account and lump sum methods. This can be accomplished by letting contracts at a fixed bid price, the railroad guaranteeing the contractor against loss, such as unforeseen increases in labor or material costs, encountering quicksand or other adverse conditions. His profit, however, would depend entirely upon his own efforts in securing efficiency from his forces. Guarantee of completion would be secured by holding back a fixed percentage of the contractor's monthly payments, which, with the proposed form of contract could be based either on the measured percentage of completion of the work or on his actual payroll and material expenditures. Experience would point out which method would be preferable. Fifteen or 20 per cent held back would probably be adequate. Prompt completion of the contract could be insured by paying the contractor a bonus for every day it is completed before the date specified or by penalizing him a reasonable amount for failure to complete the work on that date.

Such a form of contract would stimulate competition because men of limited financial resources could undertake work of a magnitude which they would not dare touch on the old lump sum basis. Under the force account system, experience has shown that there is little real competition, all of the bids usually showing the same laborers' or mechanics' rates, which, of course, are the prevailing rates in the community, the man who secures the contract doing so by resorting to the expedient of showing a low figure, sometimes below the actual, for one or two timekeepers, foremen or water boys. With the proposed form of contract, contractors will bid closer than under the old lump sum method because they are guaranteed against loss and are relieved of having to put up a bond to insure completion, with a consequent saving to the railroad or party for whom the work is done.

Had such a form of contract been in general use during the past two years, it goes without saying that the saving to the railroads would have been considerable, and what is of even greater importance the demoralization of labor for which the force account method of letting work was largely responsible, would have been in a large measure averted.

C. C. HENKEL,

Assistant Supervisor, West Shore Railroad.

METHODS FOR CONTROLLING TIE RENEWALS

Empalme, Senora, Mexico.

TO THE EDITOR:

The discussion of methods for controlling tie renewals is a subject in which I am much interested. The cost of ties to our company is high, for it is necessary to import nearly all of them from the United States and the long haul contributes considerably to the price. The question has impressed me as being of sufficient importance to demand the personal attention of the ranking division officers. Consequently, I, as superintendent, and the division engineer, have formulated a method of tie inspection which has been carried out with excellent results.

The inspection party consists of the superintendent, the division engineer and the roadmaster and assistant roadmaster, the extra gang and section foreman of their respective districts. Section foremen are invariably taken over their own and the adjoining sections, and on occasions are carried over two or three additional sections, the party consisting, at all times, of the superintendent and division engineer, a roadmaster, an assistant roadmaster, and as many as three or four section foremen.

Whenever picking up a roadmaster, assistant roadmaster, extra gang or section foreman, sufficient time is taken to explain the general policy of tie renewals, which is to the effect that the traffic and its probable slight increase, the speed and the weight of power should be considered in forming their conclusion as to the ties which should be renewed in the next six months with the object of improving conditions as a whole and having a little better track at the end of six months than at present. To arrive at a figure upon which to base the number of ties necessary, an inspection is made of the ties in the track from every third kilometer board to a point opposite the third telegraph pole beyond.

After this explanation the new man, the man last picked up, is required to mark the ties in two rail lengths that he considers should be renewed within the next six months. This done, the entire party discusses his judgment. On completing the inspection of the track over the distance of three telegraph poles, each man is required to write on a slip of paper the number of ties which, in his estimation, should come out within the six months, folding up the slip and handing it to the superintendent. The superintendent then reads the results which are noted by the division engineer and the general average of these figures is used as the basis of the estimate.

We believe that this tie inspection has gone a long way towards correcting the many misunderstandings of the general policy of tie renewals which have been developed during the past five years, owing to the chaotic conditions under which we have been operating and the resultant changes in personnel of our organization from laborers to roadmasters. We believe that the instructive consultations held with section foremen have a lasting and beneficial effect and that if we keep this matter prominent in the minds of our section foremen, which it is our intention to do, a saving of many thousands of dollars in the aggregate will result to the company in due time.

M. J. KINGSBURY,

Superintendent, Ferrocarril Sud-Pacific De Mexico.

WHERE IS THE SUPPLY OF RAILROAD CROSS TIES COMING FROM?

A Discussion of the Causes Contributing to the Shortage—Present Situation More Promising



ARE THE ROADS going to be able to secure enough ties for their requirements this year? This is the question which has given maintenance of way officers most serious concern during recent months. That there has been a shortage, so acute as to be alarming, few will deny. That this condition has been relieved greatly in many areas during the last few weeks is equally certain. However, this recovery is so recent and the shortage is still so serious on a number of roads that it is felt by many railway men that all danger has not yet been removed.

SHORTAGES OF BASIC TRACK MATERIALS

Ties and rails are the two basic and most essential materials in track construction. With adequate supplies of these, tracks can be maintained in safe condition; without them is impossible. Following the inauguration of federal control of the roads, the railroad administration took over the purchase of both of these supplies. Their delivery to the roads has therefore been the province and problem of the Division of Finances and Purchases.

At the time the government assumed the control and operation of the roads, the steel mills were behind in their deliveries of rails, while large tonnages were on order for delivery in 1918 and 1919. At the same time we were in the midst of the war and the steel mills were diverting their maximum output to meet military requirements. This led to a marked reduction in the tonnage of rails rolled. As a result only 1,097,277 tons or 7,431 track miles of new rails were laid in 1918 as compared with 1,233,031 tons or 8,233 track miles laid in 1917, 1,450,952 tons or 9,831 track miles laid in 1916 and a normal average of about 1,600,000 tons.

A similar deficiency has been experienced with reference to ties, although it has been brought about largely by other causes. In 1918, the number of ties placed in tracks was 78,958,224, as compared with 81,154,529 in 1917 and 90,140,076 in 1916. In other words, the tie renewals in 1918 were only 88 per cent of those in 1916, while only 76 per cent as much rail was relaid. The tie situation is even more serious than is indicated by these figures because of the depletion of the surplus normally carried in stock. It requires several months to season a tie ready for use and some roads which treat their supply normally carry a year's requirements on hand. With the curtailment in production which occurred last year, this reserve stock was drawn on heavily and on many roads practically to the point of exhaustion to make the renewals shown above. On January 1, 1918, the roads under Federal control had on hand 38,528,530 ties, while one year later this stock had been reduced to 29,576,958, a decrease of 26 per cent.

It is because of these conditions that those in charge of track maintenance have shown so much concern over these deficiencies in the supplies of rails and ties. This is particularly true of ties, for while rails can be produced quickly if occasion demands, several months are required to get out and season a tie after it is cut in the

forest, and even longer if it is to be treated. Because of this concern we present the following discussion of the present tie situation and the causes contributing to it.

EARLY ACTIVITIES OF CENTRAL PURCHASING DIVISION

Prior to the inauguration of federal control and the centralization of purchases of ties in the Division of Finance and Purchases, the roads negotiated directly for their ties with a variety of classes of sellers. Many roads bought all or a part of their ties from small producers on their lines. Where they had to go beyond their own lines they usually negotiated with contractors of larger output, although the Baltimore & Ohio sent its own tie agents onto foreign lines to purchase direct from the small producers. In the states along the Pacific coast the production was secured almost entirely from the large operators who made their own ties. In the Appalachian, Ozark and Arkansas areas probably 50 per cent of the production was handled by brokers, who collected the output of small producers and sold these ties to the roads, some firms being both brokers and producers. In many instances these brokers advanced the money for the purchase of timber or supplies, taking their pay in ties. Again, some contractors served primarily as tie purchasing agents for the roads, others had exclusive contracts, while still others sold their ties on specific contracts for definite numbers at a fixed price or on a cost plus basis.

These were the conditions prevailing when the government took over the roads on January 1, 1918. At this time, following decreasing deliveries, prices were advancing rapidly, being raised as much as 25 cents per tie at a time in some instances. There was also active competition between roads for ties and some of the more prosperous lines were outbidding the smaller roads for the ties produced along the latter lines, thereby taking from them their normal supplies. This also materially increased the cross hauling of ties. The situation was rapidly approaching confusion when, about February 1, 1918, one of the smaller roads in the Southern region protested to the regional director regarding the action of a larger road in buying ties away from it along its lines. The regional director presented this protest to a meeting of his staff, at which it was referred to the regional purchasing committee for consideration. About the same time a similar protest originated in the Western district, where one road purchased all the ties off the lines of another road at an increase of 75 cents per tie in prices.

Before the regional purchasing committee had taken any action the situation came to the attention of the director general and he issued arbitrary instructions on March 13 to the effect that no road could pay more for ties than it was paying on December 31, previous. In view of the increases which had taken place in the interval between these dates, compliance with this order brought the purchase of ties to a standstill and many roads canceled all orders, although some roads disregarded this instruction in so far as purchases along their own lines were concerned. This order threw consterna-

tion into the ranks of the tie producers, for no consideration was given to the ties produced on contracts or other assurance of higher prices and not delivered on the date of the order. Therefore, all production of ties was also stopped. Impressed by the acuteness of the situation, the purchasing agents in the Eastern region met to consider the problem and decided to interpret this order as permitting the continuance of payment of the prices in effect on March 13 for ties produced along the lines of the purchasing road.

About this time (in April, 1918), the Forest Products section of the Central Purchasing Committee was created to handle the purchase of all ties and timbers required by the roads under federal control. One of its early acts was the issuance of 12 basic principles to govern the purchase of ties, among which were the following:

No railroad under control of the Director-General may purchase ties on any railroad not under its control with which such road connects.

Any railroad under control of the Director-General may purchase ties on any railroad not under his control with which such railroad connects.

The prices shall be fixed on the various lines by the individual railroad companies, subject to approval by the Regional Purchasing Committee, and at such figures as will cause the production of a sufficient number of ties to meet the requirements of all the railroads.

Every railroad should endeavor to secure the maximum output of ties on its line, so that its own requirements can be met with the minimum amount of transportation.

Ties on railroads which produce more than are needed for their own use, should be transferred under the supervision of the regional committees to railroads on which a shortage exists.

Prior to this time data were compiled relative to all unfilled orders for ties held by contractors. This investigation showed that it was a common practice with some contractors to allow certain orders to remain unfilled if they were able to negotiate new contracts at higher prices on which they concentrated their output. The Central Advisory Purchasing Committee, therefore, arranged to take over all outstanding contracts and issued the following instructions early in May:

"1. All contracts or orders for cross ties placed prior to government action March 13, 1918, must be handled on their merits. Roads having such contracts or orders unfilled should immediately take up with the contractors the questions of completing shipment by June 15.

"2. There may be old contracts made at low prices that should be revised. In such cases the committee will consider such recommendations as the roads submit. In the event of any question as to adjustment of price, the matter should be taken up direct with the contractor and, if an increase is warranted, the recommendation of the road interested should be submitted for approval to the Regional Purchasing Committee with full explanation.

"3. The receiving roads will continue to take up and inspect the ties the same as heretofore. It is hoped that all such contracts or orders as are not completed by June 15 should be given special consideration at that time as to the best means of handling and completing them.

"4. All embargoes on ties to be shipped from one road to another should be lifted and the ties moved as soon as possible.

"5. The road on which ties are produced will give every assistance possible to secure prompt completion of such orders and contracts.

"6. If there is any shortage of cars for moving ties, the matter should be brought to the attention of the regional director."

In June further instructions were issued canceling contracts for ties produced on foreign lines where this could be done, the local roads taking them over and accepting the ties.

UNIFORM SPECIFICATIONS AND PRICES

Up to this time ties were being purchased in accordance with the specifications of the different roads and in accordance with their inspection. There were, therefore, almost as many specifications as there were roads in the

market, while there was an equal diversity of practices in the enforcement of inspection. The result was an entire lack of uniformity as to standards of manufacture, one road accepting as of relatively high grade, ties which another road rejected.

With the concentration of purchases of ties in the Central Purchasing Committee, it was a logical step to introduce standard specifications and standard inspection. Accordingly, on June 11, standard specifications were issued, effective July 1, accompanied by uniform instructions for inspection. These specifications, which appeared in the *Railway Maintenance Engineer* for August, 1918, established five grades of both sawed and hewn ties and included tie for use with and without treatment. Their principal differences were in the reversion of the order of classification in common use so that a No. 1 tie is now the smallest accepted and in the establishment of a 6-in. by 6-in. pole tie or a 6-in. by 7-in. sawed tie as the smallest complying with the specifications.

Following the preparation of standard specifications and as a corollary to this step, was the establishment of uniform prices for the different classes of ties. These prices were established by the regional purchasing committees, subject to the approval of the Central Purchasing Committee and are in general uniform for a given class of ties throughout a region, although they are being revised from time to time to meet changing market conditions. These prices have been fixed largely on the basis of the relative service life of the different classes of timber, a practice somewhat at variance with that of some roads which had accepted certain woods to the exclusion of others. These prices are paid alike to the large contractor producing many ties and to the small farmer cutting a few. To protect the producer during the interval between the cutting of a tie and its delivery, he has recently been assured of the maintenance of the present prices to June 30 in the far west, to September 30 in the Eastern region and to December 31 elsewhere.

Following the establishment of uniform prices, they were posted throughout the tie-producing areas in an effort to stimulate production among the small woodsmen. By this step the broker was largely put out of business, for the producer, knowing the government price, was not inclined to sell to another party at a lower figure. As a further aid in stimulating production, steps were taken to pay for ties promptly on delivery and acceptance.

In distributing the ties to the roads, the aim is to deliver them at the point of use as cheaply as possible, all factors, including transportation, considered. All ties are inspected by the forces of the road along whose lines they are produced. A road requiring more ties than are produced along its lines makes requisition on its regional purchasing committee, which places it with other roads in its region if possible, or, if not, forwards it to the Central Purchasing Committee, which refers it to a purchasing committee in another region. As far as possible the Central Administration distributes the surplus ties of one region through the engineering assistants to the regional directors, although in some regions they are distributed to the individual roads direct from Washington.

Early in its activities, the Forest Products Section recognized the value of tie treatment and arranged for the continuance of this practice where it had been followed under private control and for its gradual extension to other roads. One of the early effects of the war was to shut off the importation of creosote oil from Europe. This resulted in a shortage of preservative materials in this country which forced many plants to close down. To maintain the output of treated ties at the maximum, the Forest Products Section took over the distribution of creosote late last fall and since that time it has been al-

lating it to those commercial and railway-owned treating plants prepared to treat cross ties. It has also prepared and put into effect standard specifications for the treatment of ties by the different processes in common use. In this way it has been possible to operate more plants and more nearly to their capacity.

ATTITUDE OF THE PRODUCERS

It is not to be expected that such radical innovations as have been introduced in the tie industry could be put into effect without criticism from those affected by these changes. The criticism has been very acute from the tie brokers, who are largely put out of business. It has also come from many tie contractors who have had to revise certain of their methods and from railway men who blame the Central Purchasing Committee for the failure to receive the ties they require for the proper maintenance of their tracks.

The hostility of the tie producers was incurred first by the issuance of the order on March 13, referred to above, limiting the prices which could be paid for ties to those which had been in force on December 31 previous. Coming as this did without previous announcement and in the face of rapidly rising prices for practically all commodities, its result was to bring tie production practically to a standstill and to confront producers, who had incurred higher costs with the knowledge and consent of the purchasing roads, with the prospects of large financial losses. While this order has since been superseded, this sudden and arbitrary action, which is now generally admitted to have been ill-advised, served to create an antagonism towards the Central Purchasing Committee which has resulted in hostility to many of its later acts more acute than those measures themselves warranted and has contributed directly to the curtailment of production.

One of the points at issue between the Railroad Administration and the tie producers is the recognition of the small producer. The tie contractors believe the practice of the Railroad Administration to be unfair towards them when it pays the same price to the small farmer who brings out a wagon load of ties produced during spare time as to the contractor who has invested a large amount of money in timber holdings, in equipment and in an organization. Furthermore, looking into the future, when the ties are cut from the wood lots along the tracks the farmers source of supply is exhausted, while the tie contractor has the organization to go further back to new areas and get out ties. Also, in the absence of a contract as at present, a contractor hesitates to organize on a big scale, even though prices may be guaranteed for some time in advance, as has recently been done.

The contractors, and particularly the brokers, also criticize the action of Railroad Administration in appealing to the small producer. By posting the prices paid all through the timber, it became impossible for the brokers to purchase ties from the small producers at prices which would enable them to make a profit. Many of these small producers in the Southern states were dependent for credit for timber holdings and for supplies on these brokers and with the removal of this credit they were forced into other work and this output has been lost.

In justifying its attempts to stimulate production by appealing to the small producers, the Railroad Administration points to the large number of unfilled contracts in existence a year ago and to the steadily decreasing output in practically all regions prior to the period of federal control. It is further pointed out that in the Cumberland and Tennessee river areas and in the Pocahontas region, where no changes in purchasing methods were introduced in 1918, the contractors were able to pro-

duce but little over 50 per cent of a normal supply. From the standpoint of the Central Administration it was, therefore, necessary to develop new channels of production.

Another point of difference lies in the fixing of prices uniformly over large areas or entire regions in disregard of freight rates. The contractors urge the establishment of prices at certain primary receiving points, as at St. Louis and the Ohio river, the prices in the interior being below these figures by the amount of the freight. They maintain that competitive buying in the past has been on this basis and has fixed the value of their stumpage. Now with uniform prices in the timber a foreign road is paying prices for ties varying as much as 25 cents, owing to the difference in freight charges. Furthermore, with varying prices prevailing in the different regions, there may be a difference in price of several cents per tie between nearby points in adjoining regions.

Although there was considerable opposition at first to the standard specifications, this was largely due to the underlying hostility previously engendered and has now largely disappeared. It was increased in some instances by the unwise or overzealous interpretation of their provisions, a problem inherent to the training of a corps of 2,500 inspectors to a new system of operation. A point of controversy at first was the raising of the dimensions of the smallest tie coming within the limits of the specifications, the contractors protesting that this increased the wastage in the forests. When it was explained that the intent of the specifications was to discourage the cutting of small trees and that ties smaller than No. 1 cut from the tops of trees producing larger ties would be accepted as usual rejects, this objection largely disappeared. At the present time, the majority of the tie producers feel that the uniform specifications are working to their benefit as well as that of the roads.

The position of the tie producers on the entire situation, as expressed by a committee of their organization, the National Association of Tie Producers, in a recent appearance before the Division of Purchases at Washington, is that roads on which ties are produced should continue to purchase at present prices such ties as are offered up to November 1; that any railroad may immediately enter into contracts with individual tie producers at prices not to exceed those now in effect at point of shipment up to November 1, provided the quantities and kinds of ties contracted for are approved by the Railroad Administration; that all cross ties should be inspected by regional inspectors at the point of shipment and that the purchase of cross ties for delivery after November 1 should be made in accordance with the following plan:

1. The railroads should register their annual cross tie requirements with the Division of Purchases and all ties should be purchased in accordance with national standard specifications.

2. All ties should be inspected by regional inspectors in accordance with standard rules for application of the specifications.

3. Individual roads should enter into contracts for their tie requirements direct with responsible tie producers, filing copies of the contracts with the Railroad Administration.

4. All contracts should be awarded only after fair and open competition has developed the lowest price per tie obtainable from responsible tie producers.

PRESENT SITUATION IS ENCOURAGING

So much for the past and the causes contributing to the shortage. What is the situation at present? This can best be indicated by the statistics of ties purchased

for recent months. Those for August, 1918, to March, 1919, inclusive, are as follows:

August, 1918.....	3,700,009	December, 1918.....	5,652,572
September, 1918.....	3,827,974	January, 1919.....	5,827,769
October, 1918.....	4,522,580	February, 1919.....	7,994,000
November, 1918.....	4,830,871	March, 1919.....	10,150,000

In the six months ending with March of this year the purchases by regions have been:

Eastern region	2,793,792	Northwestern region.....	10,847,977
Pocahontas region....	1,155,171	Central West'n region.....	2,255,079
Southern region	11,143,048	Southwestern region.....	7,607,463

An interesting feature of this improvement is the large increase in the local production in the eastern states which were not commonly considered tie-producing areas. A conspicuous example of this is the production which has been developed on the Pennsylvania Lines West of Pittsburgh, where 199,377 ties were purchased in the first four months of this year as compared with a total of 68,563 ties purchased during the entire year of 1918 and 19,311 ties in 1917. In the first three months of this year the purchases in the Eastern region were 260 per cent of those for the same period of the preceding year, although in fairness to this comparison it must be recalled that this period of this year was one of favorable weather conditions, while at the same time a year ago the winter was one of unusual severity.

In general the ties have not been diverted far from their natural channels, although because of the acute shortage on the Eastern roads and an over-production of Douglas fir ties in the far west, approximately two million ties have been ordered from that region, one-half of which are being moved to points along the Atlantic seaboard by water and the remainder are coming by rail for distribution to the eastern central states.

With normal annual requirements for renewal purposes of approximately 90,000,000 ties, or a monthly average of 7,500,000 ties, it would appear that the crisis has been passed and that we are now assured of an adequate supply of ties. In fact, it is the hope of the Forest Products Section that not only will the roads receive all of their ties which they require for normal maintenance, but that they may also be able to replenish their depleted stocks. Others, equally gratified at the purchases of the last two months but less optimistic, point to the fact that the large deliveries during February and March have been facilitated by a number of conditions which may or may not continue. In most of the tie-producing areas the past winter has been one of the most favorable ever encountered in the history of the industry, with the result that it has been possible to make and to haul out to the railroads larger numbers of ties than ever before. Furthermore, although several weeks and frequently months normally elapse from the time ties are cut until they are delivered to the railroads, this period has been greatly decreased during recent months because of the fear that the present high prices might be lowered at any time. Likewise, the conclusion of the war and the return of large numbers of men to civil life has created a surplus of labor in many regions and this labor has been diverted temporarily to the production of ties. However, the evidence leads strongly to the conclusion that at least the urgent needs will be met.

The influence of these increased deliveries is being felt rapidly by the roads to whom the ties are being sent. One road which was in a bad way for ties early in March reported late in April that the deliveries during the intervening weeks were sufficient to relieve the situation materially. Another road using treated ties, the officers of which were equally alarmed last winter, now state that the only alarm now existing is that there may be an over-

production of treatable ties beyond the capacity of the treating plants to treat them.

In the Northwestern region the situation on April 1, 1919, has been tabulated as follows:

PRODUCTION.

Ties placed in track since January 1, 1919.....	1,200,000
On right-of-way available for immediate use.....	9,300,000
At treating plants awaiting seasoning and treatment...	1,900,000
Estimated production for balance of year.....	14,700,000
Oak ties due from other regions.....	4,000,000

Total available ties in Northwestern Region for 1919.....31,100,000

DISPOSITION.

Renewals, Northwestern Region.....	17,200,000
New side tracks and other construction.....	1,000,000
For seasoning and treatment at treating plants and for carry-over for 1920	6,200,000
Export to other roads.....	6,700,000

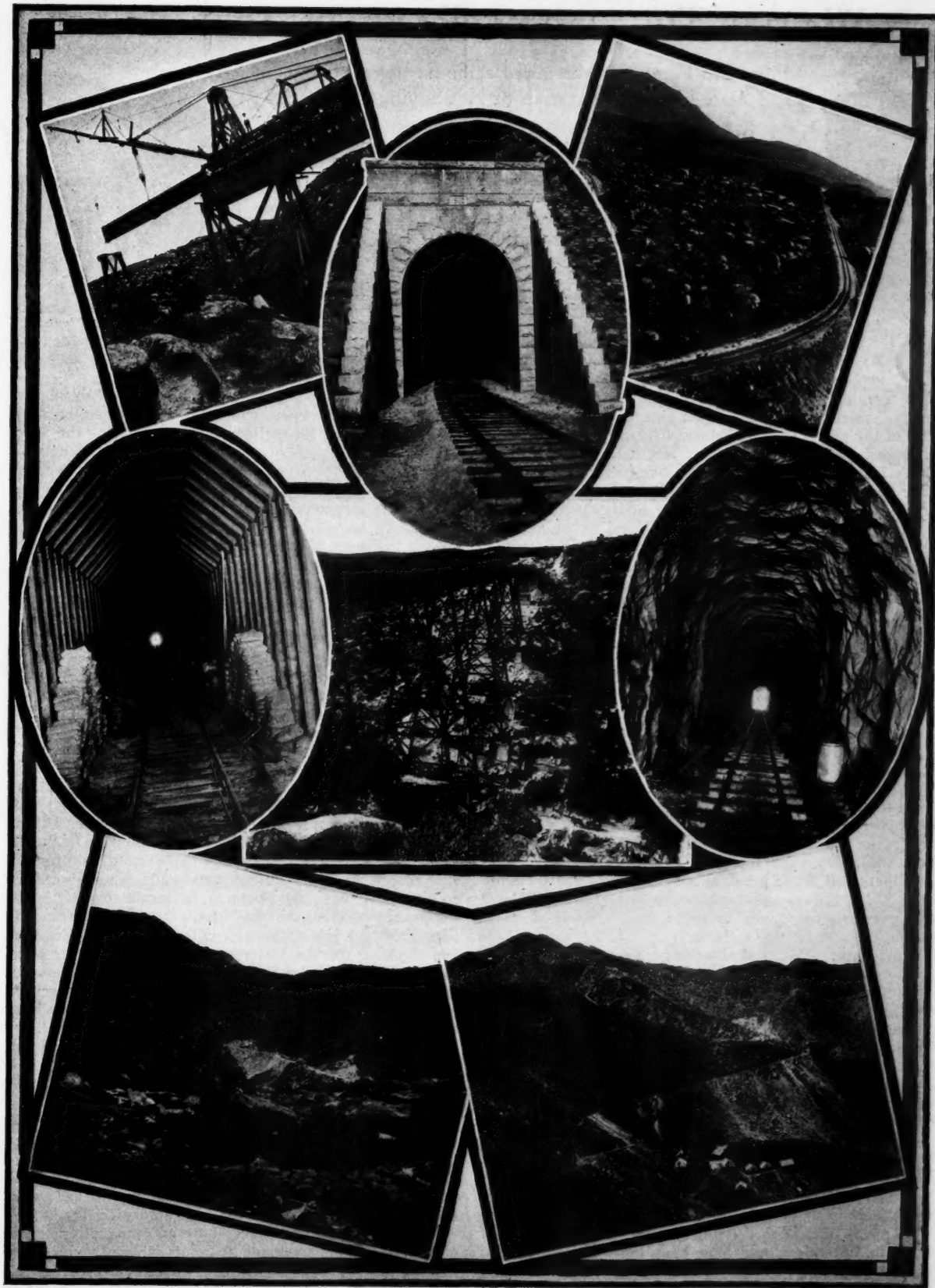
Total31,100,000

In the Southern region, which is one of the principal tie-producing regions, it is estimated that the production in 1919 will be about 35,000,000 ties, or in excess of that of any previous year, although this is considerably short of fulfilling the program of the Forest Products Section for 44,000,000 ties, about one-half of which are scheduled for use on roads within the region and the remainder for shipment to other regions.

Large as the production of ties is in this region, this in itself is creating a special problem because of the large percentage of the ties now being produced which require treatment before insertion in the tracks. Nearly all of the roads in this region have been using ties untreated and they have neither the facilities or, in general, the desire to go to treated ties. In past years a large part of the ties shipped to roads in other regions have been of white oak and heart pine, which were used untreated. This condition, combined with the present demand for ties for immediate insertion in the tracks has depleted the supply of ties which can be used without treatment, while it is creating a surplus of treatment ties which will not be available for use until late this fall or early next spring because of the time required for their seasoning and treatment. This condition is causing the Forest Products Section of the Railroad Administration and others to give serious attention to the encouragement of the use of treated ties.

Favorable as recent developments are, the fact that the acuteness of the situation has not been relieved universally is indicated by the report from another road whose annual requirements are in excess of 2,500,000 ties and which was able to insert less than 1,500,000 ties last year, while at the same time reducing its surplus 500,000. For the first four months of this year only 20 per cent of its 1919 requirements had been received, while only 4 per cent of its renewals had been completed on April 1. This condition exists in spite of strenuous efforts which have been exerted by officers of the roads and others to promote local production with marked success, over 60 per cent of the ties secured since January 1 coming from its own local sources of supply.

One interesting development of the centralized purchase of ties has been evident on some of the smaller roads in the tie-producing regions. In the past it has been the common experience that the larger and more prosperous roads would buy the better grades of ties from their lines, leaving to these roads the poorer ties which they could secure at cheaper prices. Under common control these roads are now receiving the same grades of ties as other lines and as a result they are being placed in better condition than at any previous time in their history.



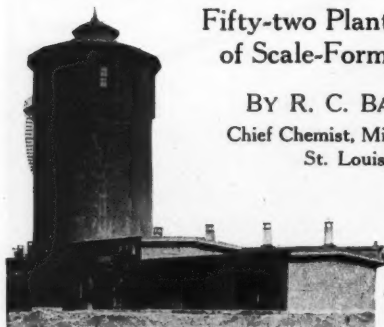
BUILDING AN INTERNATIONAL RAILWAY

The San Diego & Arizona is constructing a line between San Diego, Cal., and El Centro, partly in the United States and partly in Mexico. One section of 11 miles in Carrizo gorge requires 17 tunnels with an aggregate length of 13,392 ft.

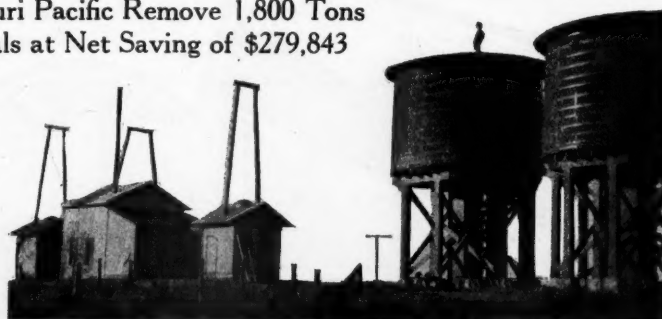
WATER TREATMENT PAYS 181 PER CENT

Fifty-two Plants on Missouri Pacific Remove 1,800 Tons of Scale-Forming Materials at Net Saving of \$279,843

BY R. C. BARDWELL,
Chief Chemist, Missouri Pacific,
St. Louis, Mo.



A Continuous Plant



An Intermittent Plant

DURING 1918, the water softening plants on the Missouri Pacific treated 1,368,305,000 gal. of water, removing from this water 3,589,473 lb. of scale-forming matter. There are 52 water-treating plants on this system, the majority being in the hard water district of the plains west of Kansas City, although the plant of largest capacity is situated at North Little Rock, Ark. These plants, which represent an investment of \$154,300, have been in service from 2 to 13 years. On the basis of a saving of 11 cents per pound of incrusting matter eliminated before the water was delivered to the locomotives, as outlined by the Water Service committee of the American Railway Engineering Association in 1914 and corrected to conform with present high prices for labor and material, the total saving to the railroad from the removal of this scaling material amounted to \$369,716. The cost of treatment, including labor, chemicals, maintenance, and 10 per cent on the investment to cover depreciation in treating facilities, was \$89,873, leaving a net saving of \$279,843, or 181 per cent, on the amount invested.

The benefits resulting from water treatment are numerous, but mostly of an intangible nature and difficult to convert into direct financial returns. However, values were placed on four items, the saving of fuel resulting from the removal of the insulating effect of the scale, the increased life of flues, the decreased repair work on flues and boilers in the roundhouse, and the saving in engine time while down for repairs. The average cost of coal was increased \$0.90 per ton, a set of flues \$216, engine time \$12 per day, and roundhouse flue repairs 135 per cent over the prices used by the committee in 1914. The saving brought about by the reduction in engine failures and delays to traffic, and also the quicker turning of locomotives with the increased service is much greater, owing to the large increase in overtime rates for employees as well as stringent power shortage during this period.

Approximately 700 of the 1,094 locomotives operated by this company were directly affected by the use of the treated water. The total gross saving of \$369,716 is equivalent to a gross saving of \$529 per engine, or a net saving of \$400, which appears reasonable in view of the generally improved performance.

The 3,589,473 lb. of scaling matter removed from the water would be equivalent to 36 carloads of 50 tons each. If this scale had been allowed to go into the locomotives a conservative estimate of the portion adhering to the tubes and sheets would not have been below 25 per cent. This means that with the untreated water an average of 1,282 lb. of scale would have been deposited in each of the 700 engines, forming an insulating coating about $\frac{1}{8}$ in. thick on all exposed boiler surfaces. As a matter of fact, the scale would have been much thicker and heavier in some districts, as on several divisions $\frac{3}{8}$ in. scale was

not uncommon after 6 to 8 months' service, before the installation of softening plants, which caused large loss in locomotive operation.

The best available data indicates that an insulating scale of $\frac{1}{8}$ in. thickness causes an increase of between 15 and 20 per cent in fuel consumption. Using the average rate of six pounds of water per pound of coal burned, 946,411 tons of coal were required to evaporate the 1,368,305,000 gal. of water into steam at boiler temperatures. It is safe to presume that at least 10 per cent more coal would have been consumed if the scale originally present had been allowed to accumulate on the tubes and sheets instead of having been removed before the water was given to the locomotives. The increased fuel consumption which would have followed the use of untreated water would have amounted to about 100,000 tons for the year 1918, which is an important item for the period, particularly when the general shortage of coal and cars is considered.

Of the 52 water-treating plants on the system, 31 are of the intermittent type and 21 continuous. The majority were installed by company forces on designs furnished by the engineering department. The plants were designed to afford all possible use of facilities already existing at a minimum expense. Where convenient, an additional roadside tank was installed with necessary air pipes for agitation and a steam jet or ejector for adding the chemicals. At small stations where the rate of pumping is low, a small inside tank with filter and mixing box was placed in the roadside tank and chemicals added continuously with the water. In large standpipe-type steel tanks good success has been secured by putting the chemicals and water through cylindrical downtake tube and drawing off the water at proper height after sufficient time has allowed for clarification to take place without use of a filter. Good results have also been secured in a large capacity continuous plant with constant head and float regulator for the chemical proportioning.

The plants are operated by the regular pumpmen and maintained by the division water service forces. The treatment is regulated and general supervision given by chemists located at Little Rock, Ark., and Kansas City, Mo., these being convenient central points. Semi-weekly samples of both the raw and treated water are furnished these laboratories and results of these tests are reported to division as well as general headquarters. A limit of six grains per gallon for hardness remaining in the water after treatment is allowed for satisfactory results and all results above this limit necessitate an explanation. Frequent inspections are made at points where trouble is indicated or expected and inconsistencies corrected.

It has been found that an important item in securing satisfactory results from water treatment lies in adequate supervision. Any type of treating plant conform-

ing to the three essential principles, proper chemical proportioning, suitable mixing and agitation and sufficient settling period, will give satisfactory results with proper attention. Not only must the chemical formula and treatment be checked, but the satisfactory operation and condition of the facilities must be assured by frequent inspection. Lax attention may easily result in loss many times in excess of cost for adequate supervision. This supervision should not be confined to treatment alone, but extends from inspection of quality and condition of

siderable difficulty is met in tracing cause or source. However, experience and records thus far made indicate that pitting on non-treated water districts has become more noticeable and severe than on districts where treated water is used. Investigations and experiments tend to indicate that water carrying a slight caustic soda alkalinity, which would also mean but a slight amount of scale, gives the best results in service. On two engine districts in Western Kansas and Eastern Colorado treating plants have been installed at all water stations so that this condition may be assured all water given to locomotives. These plants have now been in service about two years, and although the entire elimination of pitting has not been secured to date, the attack on fireboxes appears to have been stopped and the greatly improved condition and service of the flues would indicate that the small amount of pitting taking place may be due to scab pits on old flues which have been replaced in the boilers.

Summarizing the benefits of treated water as noted to date:

1. A large saving has been made in fuel consumption, owing to the elimination of heavy insulating scale.
2. Roundhouse boiler repairs have been reduced on treated water districts from 30 to 60 per cent.
3. Life of flues has been increased from 30 to 300 per cent with corresponding betterment of general boiler conditions.
4. Pitting has been materially reduced with increased life of flues and fireboxes.
5. Engine failures from boiler troubles on treated water districts have been very materially reduced with corresponding improvement in general traffic conditions.

MAINTENANCE MEN BOOST VICTORY LOAN

EMPLOYEES OF THE maintenance of way department, in common with those in other branches of railway service, took a live interest in the Victory Loan. A wide variety of methods was adopted to bring the loan to the attention of the employees in new and novel ways which would attract their interest and create enthusiasm.

THE NEW YORK CENTRAL "TANK"

One of the most novel measures was the conversion of a motor car into a tank by A. M. Clough, track supervisor on the New York Central, at Batavia, N. Y. In this, as



The Tank on Its Way

in previous loans, Mr. Clough has endeavored to present the subject to his employees in a manner in harmony with the advertising displayed so profusely in the larger cities.

RESULTS OF WATER TREATMENT ON MISSOURI PACIFIC							
Station	Source of Supply	Raw Water Hardness in Grains Per Gallon	Annual Consumption in Gallons	Pounds of Scale Removed	Original Cost of Treating Facilities	Total Additional Cost for Treatment	Total Saving
Dupo, Ill.	Well.i*	29	145655000	495227	\$ 8500	\$ 7135	\$38204
Prairie du Rocher	Well.i	25	323400000	97020	3000	1800	10672
Gorham, Ill.	Well.i	22	399400000	103294	7000	2037	11360
Bush, Ill.	Creek.c	7-61	526340000	105268	1900	3547	7720
DeSoto, Mo.	Creek.i	10-30	420910000	94360	5000	1936	10380
Bismark, Mo.	Well.i	44	366190000	201404	4200	3223	22154
Piedmont, Mo.	Creek.i	5-16	439440000	58732	4200	1202	5900
Sedalia	Well.i	19	263390000	67946	1500	1824	6374
Kansas City, Mo.	River.i	12-22	1399400000	232899	10000	9250	26198
Kans. Mo.	Well.i	51	486500000	31622	3000	1420	3476
Elevator Oak Mills, Kans.	Well.o	30	61460000	22125	1800	904	2433
Union, Neb.	Well.i	30	195140000	58542	7500	2146	6449
Auburn, Neb.	Creek.i	15-25	162000000	16200	3000	739	1732
Wesley, Neb.	Creek.i	9-16	80690000	9060	2000	569	887
Water, Neb.	Well.o	28	14050000	5058	750	145	556
Berlin, Neb.	Creek.c	14-21	117590000	19990	750	307	2199
LaPlatte, Neb.	Well.i	26-44	81080000	38432	3000	920	3567
Greenleaf, Kans.	Well.i	32	64210000	26326	2300	828	2895
Concordia, Kans.	Well.o	18	39980000	7996	750	272	879
Jameson, Kans.	Well.o	16-18	166960000	33392	6000	1001	3673
Downs, Kans.	Well.i	21	16410000	3938	360	187	433
Lenora, Kans.	Creek.i	15-65	131220000	70732	3000	2215	9560
Herrington, Kans.	Creek.c	12-40	161910000	48573	3000	1191	5343
Gypsum Cr., Kans.	Well.o	24	163990000	49167	750	1466	5408
Marquette, Kans.	Well.o	17	138060000	26412	750	397	2905
Bushon, Kans.	Well.i	16-19	572050000	120130	5000	1969	13214
Holington, Kans.	Well.o	16	83970000	13419	1000	290	1476
Bison, Kans.	Well.o	14	59130000	7095	1000	265	780
LaCrosse, Kans.	Well.o	12	122750000	10412	750	536	2025
Brownell, Kans.	Well.i	14	85650000	13704	2300	563	1507
Pendennis, Kans.	Well.i	12	43350000	4768	2300	389	524
Healy, Kans.	Well.i	13	99250000	12902	2000	581	1419
Scott City, Kans.	Well.o	11	57320000	5732	1000	275	630
Coronado, Kans.	Well.i	14	128440000	16690	2300	575	1836
Selkirk, Kans.	Well.i	24	107910000	46401	2500	1049	5104
Stuart, Colo.	Well.i	22	136350000	38718	2200	794	3589
Eds, Colo.	Well.i	32	85690000	35476	2000	776	3688
Howell, Colo.	Well.i	60	18790000	15032	1300	610	1680
Arlington, Colo.	Well.i	15-65	130390000	65190	3000	1809	7170
Ordway, Colo.	Res.i	12	20330000	2439	2500	497	269
Fowler, Colo.	Well.i	13-30	291650000	64053	2500	1877	7040
Pueblo, Colo.	Well.i	50	618900000	387854	3000	9090	42663
Wichita Shops	Creek.i	11-48	135240000	27046	3000	1446	2970
LeRoy, Kans.	Creek.c	7-15	70520000	11283	750	557	1240
Hope, Kans.	Creek.c	12-25	54420000	11682	1000	490	1276
Coney, Kans.	Creek.c	15-20	38250000	6492	1000	478	714
Cedarvale, Kans.	Creek.c	8-140	52960000	27800	1000	555	2956
Winfield, Kans.	Well.i	16	38530000	7706	800	330	847
Clcott, Kans.	Well.o	22	229264000	504390	15000	12123	55581
North Little Rock	Well.i	27	148810000	41666	3600	1395	4583
Lexa, Ark.	Well.i	22	466670000	70000	3600	1805	7700
Tynne, Ark.	Well.i	20	489000000	107690	4500	2450	11345
McGehee, Ark.	Well.i						
Total			12563050000	3599473	\$154300	\$98973	\$366716

Note: Cost of Treating Facilities includes cost of additional tank where more than one is used, pipe lines, and other appurtenances.
Cost of Treatment includes cost of additional labor, chemicals, and maintenance, plus 10 per cent of investment in treating facilities.
* i indicates intermittent plant; o indicates continuous water softener.

chemicals through the operation of plant and to final action of the water as indicated by locomotive performance.

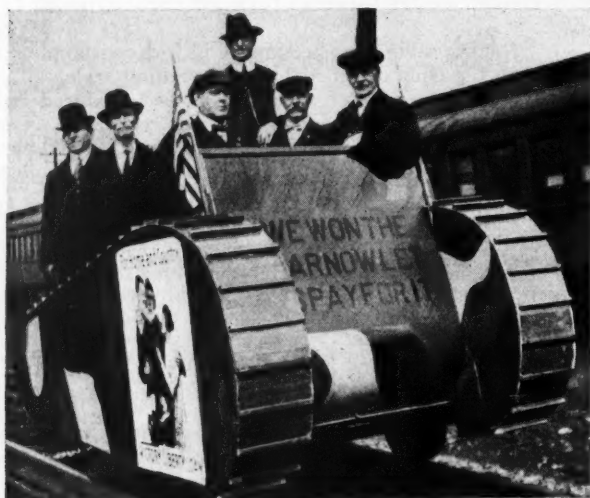
The accompanying chart shows the record of operation at each of the 52 plants. The source of supply and hardness of the raw water are noted. Figures are given for each plant showing the consumption, the amount of scale-forming solids removed, the cost of treating facilities, the cost of operation, including chemicals, labor, maintenance and 10 per cent for depreciation, and also the estimated saving secured.

The most serious trouble now encountered in locomotive operation and upkeep from the effect, or in conjunction with the use of water, is pitting. Its action is irregular in appearance and frequency variable, so that con-

The idea of the tank was adopted this time because of the important part which this implement of warfare had played in the winning of the conflict.

The tank was built over a three cylinder section motor car. Previous to its passage over the subdivision many of the Italian employees were showing little interest in the drive because of their dissatisfaction of the treatment which Italy received in the peace conference; because of the fact that many of them intended returning to Italy in the few weeks and because many of them had lost money on earlier editions of Liberty bonds through forced sales.

Because of this situation the party included the Italian labor agent, who presented arguments to the men for their subscriptions. The party also included the division florist and the fence gang foreman, both of whom knew most of the men personally. Two days were spent in covering



The Party Accompanying the Tank

the subdivision, with the result that 100 per cent of the men subscribed for amounts ranging from \$50 to \$500, with an average of \$91 per man.

NOVEL PLAN USED BY THE PENNSYLVANIA

In order to create added interest in the Victory Liberty Loan campaign and to arouse enthusiasm among the track laborers in the maintenance of way department, W. F. Miller, track supervisor, sub-division No. 1, of the Philadelphia terminal division of the Pennsylvania, hit on the idea of driving nails into a crosstie to represent individual subscriptions. Accordingly a tie was planed smooth and the words "Victory Liberty Loan" were painted on it in large letters inside the gage line for the rails. On the outside of the rails, on either side, a large letter "V" was painted. Every subscriber to a Victory bond was permitted to drive a nail into one of the letters of the words. On learning what was being done by the maintenance of way department, the other departments adopted the crosstie idea and as a result four crossties were prepared, one for each department, namely, the clerical forces of the superintendent's office, the maintenance of way forces, the transportation forces and the motive power forces.

The four crossties for these departments were placed at convenient points on the terminal division, where they were held until every subscriber had driven his nail into them. They were then placed in track at the West Philadelphia passenger station, one in each of the four

mainline running tracks, where they are on exhibition.

The crosstie feature was not inaugurated until after the Victory Loan was well under way, but it proved very helpful and resulted in materially increasing the number of subscriptions secured. The driving of the nail into



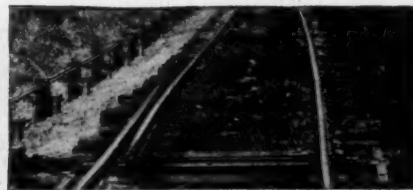
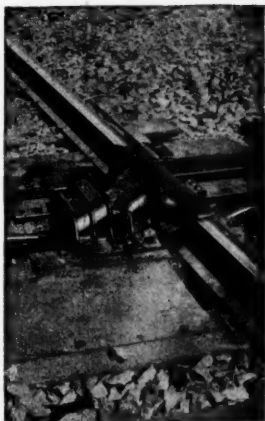
Installing One of the Victory Loan Cross Ties

the face of the tie apparently made the men feel that they were actually participating in the floating of this loan, more so than simply the signing of a subscription blank. On one occasion a track gang was assembled to drive in the nails representing their subscriptions. During the ceremony five men of the gang who had not subscribed bought Victory bonds so that they could also drive in their nails.

The result of this novel campaign is given below. Two of the departments mentioned had just barely secured 50 per cent subscriptions until the crosstie feature was started. These two departments ended the campaign with 90 and 99 per cent subscriptions.

	Subscribers	Amount	Per Cent
Division engineer's office.....	80	\$ 6,550	80
Supervisor's Division No. 1.....	548	29,700	100
Supervisor's Division No. 2.....	168	12,550	100
Supervisor's Division G.....	323	19,100	90
Supervisor's Division, South Philadelphia.....	245	14,350	99
Signal employees	132	10,200	94
Master carpenters	231	14,150	100
Floating gang	31	1,650	97
Wood preserving force.....	98	4,950	100
Division operators.....	31	1,550	88
Total	1,887	\$114,750	97.2

CALL FOR WATER-POWER LEGISLATION.—Engineering Council, through its National Service Committee, M. O. Leighton, chairman, Washington, D. C., is urging upon engineers the importance of exerting influence to promote legislation by Congress to open up for development the water power sites of the United States. These sites are of two classes: (1) those privately owned on non-navigable streams, and (2) those on public lands or on navigable streams. The first class can be developed by the owners after complying with local laws, and over 25 per cent of these possible sites have been developed. Those of the second class cannot be developed without a permit from the United States, and less than 4 per cent of them are being utilized to-day. Bills to remedy this situation have been introduced in Congress at every session since 1910.



Three Types of Derails

MAINTENANCE OF WAY men are so accustomed to the use of derails that they commonly give little thought to the general practice governing their use, assuming that the custom on their individual roads is common with that on other lines. An investigation of this subject shows that this is not the case and that there is a wide divergency in the use of this simple track device. For instance, some roads like the New York Central, Lines East, make it a practice to install derails on passing tracks, while others like the Long Island are abandoning them for this purpose. The Illinois Central and the Chicago, Rock Island & Pacific make it a practice to install derails on all tracks that lead out of the main line on which cars may stand, while the Chicago, Milwaukee & St. Paul and the Chicago, Burlington & Quincy use them in such tracks only where adverse grade or other conditions warrant. On some lines it is the practice to place derails in turntable leads, while many other roads do not require protection at such points, but may install derails at special locations, such as at the foot of coal chute inclines, on breaker tracks or on tracks running through shop buildings for the protection of the buildings.

It is the general practice on the Lehigh Valley to use pipe-connected derails, while the Long Island prefers the hand-throw type. Some roads use the pipe-connected type in automatic signal territory only, while others use it irrespective of signals. Again, some lines like the Philadelphia & Reading connect up all derails with the signal circuits through switch circuit controllers, whether the derails are pipe connected or hand thrown, while other roads like the Delaware & Hudson use the switch circuit controller on hand throw derails, but not on the pipe-connected type in automatic signal territory.

Again, the tendency towards the more general use of derails varies greatly. The Rock Island, for example, is extending their use, while the Chicago Great Western has recently removed them from passing tracks. Practice again varies regarding the use of the split point or the block type of derail. Some roads use the split point in special cases only, others like the Northern Pacific make the split point type the standard, while the general tendency of many other roads is towards the use of the block derail.

As indicated above, the frequency and the conditions under which derails are used vary greatly. For this reason data has been secured and tabulated covering the practices on 48 representative railroads in all parts of the United States and Canada in order to ascertain the conditions governing their installation at other than interlocking plants. In this investigation the following questions were asked:

(1) Are derails placed on all passing and other tracks connecting with main tracks or on only those with particu-

larly adverse conditions as to grade, vision, etc., or are they omitted from all such tracks? Is any distinction made between passing and industry tracks in this connection?

(2) Are derails commonly installed in tracks leading to turntables or at other special locations apart from the main track?

(3) Is the split point or block derail used?

(4) To what extent is the use of derails modified in automatic signal territory? Are derails in automatic signal territory equipped with switch circuit controllers?

(5) To what extent are the derails pipe connected to the switch stand or hand thrown?

(6) Is the tendency towards the more general use of the derail, and, if so, under what conditions?

(7) Have any recent instances occurred where the use of derails have demonstrated the worth of their application?

The information received was tabulated in the table accompanying this article, but in studying this table it is to be understood that it indicates the general practice of individual roads, numerous exceptions to which will be found in the discussion following.

Sixteen of the 48 roads replying to the circular of inquiry install derails on both passing and industry tracks; 13 install them only on industry tracks, while 19 install them only at locations where particularly adverse conditions as to grade, vision, etc., prevail.

INSTALLATION ON BOTH PASSING AND INDUSTRY TRACKS

In considering the installation of derails on both passing and industry tracks many different practices again exist. Some roads place derails on both classes of tracks, irrespective of the conditions existing, while others make exceptions to this rule and use derails only where adverse conditions are present. Again derails may be omitted at certain points on lines on which the general practice is to equip all sidings with derails because grade conditions may not warrant their use, while still other roads protect all main line turnouts and omit this protection on branch lines where traffic is light. Derails are omitted on passing tracks by some roads because these tracks are only used for the purpose indicated and it is felt that, with a train in the clear, there is no need of derails, as the cars are under the control of the engineman. However, on other lines the management feels that it is as important to place derails on these tracks as on industry and business tracks, because the derail definitely marks the clearance point and forces obedience in observing it, thus preventing a train stopping at a point of limited clearance.

Many roads make it a practice to install derails on both passing and industry tracks, including the Pennsylvania Railroad, the New York Central, Lines East, the Baltimore & Ohio, the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the Lehigh Valley, the Erie, the Cleveland, Cincinnati, Chicago & St. Louis and the Philadelphia & Reading. Among other roads reporting the installation of derails on part or all

of their passing tracks are the Boston & Maine, the Louisville & Nashville, the Chesapeake & Ohio and the Chicago Great Western, while still other lines place them on passing tracks under certain conditions only. Typical of such roads are the Chicago, Rock Island & Pacific, the Illinois Central, the Norfolk & Western, the Nashville, Chattanooga & St. Louis and the Seaboard Air Line.

It is interesting to note some of the variations existing among roads that make it a general practice to install derails on both passing and industry tracks. In this connection the Pennsylvania Railroad installs either a split switch derail or a block derail in combination with the split point on all exterior passing sidings and on all other tracks connected with the main track, where it is possible under any circumstances for the speed of equipment to exceed 12 mi. per hr.; when the speed cannot exceed this rate the block derail is used with the guide rail and if sidings are of infrequent use the hand throw derail is used either independently or with the guide rail. It is not the general practice to equip the interior passing sidings with derails. Apart from this no distinction is made on this line between passing sidings and industrial or other tracks connected directly with the main track. The only exception made to the installation of derails on all tracks by the New York Central, Lines East, is their use on passing sidings located between main tracks, and even these passing sidings are sometimes provided with derails when they are located on a grade which may cause a car to move toward the main track. The upper ends of a few passing sidings located on heavy grades are not protected by derails on the Delaware, Lackawanna & Western, but all other locations on this road are equipped with them. Road G (in the table) located in the central part of the country, makes it a practice to place derails on all sidings connected with the main track. On this road derails derailing in one direction only are used on passing sidings and yard leads, while at stations and industrial sidings those derailing in both directions are installed and it has been found that in some instances that trainmen have pushed cars in over the derails on such sidings with the result that they have become grooved and fail to derail cars running out over them. The only exception in the use of derails made by the Cleveland, Cincinnati, Chicago & St. Louis is on some branch lines, where the traffic is light; in such territories the sidings are not equipped with them.

While the Boston & Maine does not place derails on all passing or other tracks connected with the main track a large proportion of these tracks are so equipped and the number is gradually being increased. At the present time the Chesapeake & Ohio has installed derails on approximately 90 per cent of its passing tracks and it is the practice to equip such tracks with this device.

The practice of the Philadelphia & Reading is to place derails on all tracks leading to the main track except on the end of passing sidings in automatic signal territory that are not interlocked, while the Louisville & Nashville places derails on passing tracks in automatic signal territory only. Road A (in the table), located in the central part of the United States, makes it a practice to place derails on passing sidings in connection with the installation of new automatic signals.

The Rock Island, the Illinois Central, the Norfolk & Western, the Nashville, Chattanooga & St. Louis and the Seaboard Air Line place derails on passing tracks where they are used to set out cars at the station or where adverse conditions may exist. The Lehigh Valley places derails at the fouling points on all passing sidings and industrial tracks where there may be danger of cars dropping and fouling other tracks.

The Long Island no longer requires the use of derails

on passing sidings and is abandoning them for this purpose, while the Missouri, Kansas & Texas and the Minneapolis & St. Louis do not make it a practice to install derails on such tracks. The Chicago Great Western has a few derails on passing tracks, but this is not the general practice, and recently a number of derails have been removed from passing tracks because, with only a few such places so equipped, there was a liability of oversight on the part of trainmen, and this condition caused more frequent derailments than if the derails were entirely dispensed with.

THE USE OF DERAILS ON INDUSTRY TRACKS

The conditions governing the installation of derails on industry tracks vary considerably on the different roads using them for protection at such points. Some lines make it a practice to place derails on all industrial tracks irrespective of grade or speed conditions, while others omit them at points where the grade of the industry track falls from the main line. Still other lines place derails only on tracks where there is a possibility of cars being blown or pinched out to foul the main track.

Among the roads installing derails on station, industry, business and private tracks are the Delaware, Lackawanna & Western, the Lehigh Valley, the Long Island, the Boston & Maine, the Louisville & Nashville, the Norfolk & Western, the Missouri, Kansas & Texas, the Seaboard Air Line and the Minneapolis & St. Louis. It is the practice of the Lackawanna to install derails on all industrial sidings, while the Atlantic Coast Line occasionally omits their installation where the grade of the industry track falls from the main line. On the Boston & Maine it is now the standard practice to use derails on all new industry tracks and the same practice applies on the Nashville, Chattanooga & St. Louis. While the entire road is not equipped at the present time, this work is being done gradually and the places where derails are needed the worst are being equipped first. Road G, located in the central part of the country, installs a derail, derailing in both directions on station and industrial sidings.

The practice on the Union Pacific is to place derails on all tracks where cars are set out if these tracks are connected with the main line or if they are branch tracks, derails are then placed somewhere between such tracks and the main line for its protection. Other lines make it a practice to place derails at the fouling points on all industrial tracks where grade conditions warrant and on all tracks where cars are left standing if there is the slightest possibility of their being blown out or pinched out where they might foul the main line. Some roads following this practice are the Lehigh Valley, the Rock Island, the Illinois Central and the Mobile & Ohio.

The use of derails on the Central of Georgia is in line with the following maintenance of way rule: "Main track must be protected by approved derail devices so located that derailed cars will clear the main line on all tracks leading therefrom excepting passing sidings. They must be set and locked for derailment at all times except when in use."

THE USE OF DERAILS UNDER SPECIAL CONDITIONS

The managements of some roads feel that proper protection is provided, not by the universal application of derails, but by their location at places where grade or other adverse conditions warrant. For example, on some roads derails are placed on sidings on which the grade descends toward the main line, while others place them at points where high winds exist which may blow cars out of the sidings. Again, some states have recognized the necessity of derail installations under certain conditions and have passed legislation accordingly. In such

cases the practice on the various roads in the states is more or less uniform. In Texas the following requirements are prescribed by law: "It shall be the duty of every railway corporation operating any line of railway in the state of Texas within six months after the passing of this act, to place good and safe derailing switches on all of its sidings connecting with the main line of such railways and upon which sidings cars are left standing; provided, that no derailing switches shall be required where the sidings connect with the main line on an upgrade in the direction of the main line of one-half of one per cent or over; provided, further, that no derailing switches shall be required on inside tracks at terminal points where regular switching crews are employed."

Among the railroads installing derails on tracks where grade or other conditions warrant may be mentioned the Atchison, Topeka & Santa Fe, the Northern Pacific, the Union Pacific, the Delaware & Hudson, the Southern Pacific, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, the Canadian Pacific, the Chicago & Alton, the Chesapeake & Ohio, the Pere Marquette, the Minneapolis, St. Paul & Sault Ste. Marie, the New York, Chicago & St. Louis, the Los Angeles & Salt Lake, the Chicago Great Western, the Denver & Rio Grande and the Colorado & Southern.

The practice on the Atchison, Topeka & Santa Fe, the Southern Pacific, Atlantic System and the Canadian Pacific is to install derails according to the grade conditions; the Santa Fe installs them at the ends of all track excepting passing tracks and wyes where the grade ascending toward the main line is less than 0.5 per cent, while the Southern Pacific Lines install them on all tracks connecting with the main line except yard or other tracks on which switch engines are used, provided such tracks are not on a descending grade of 0.5 per cent or over. The Canadian Pacific protects the main track by derails where a siding may be used for storing cars having a gradient of 0.2 per cent or over towards the main line so located that there is danger of a runaway car getting either directly or through an intervening siding to the main track. These derails are placed on tracks coming off the main track or any other one leading to it.

The Northern Pacific places derails only on those tracks where particularly adverse conditions exist as to grade, vision, etc. Ordinarily derails are not placed on passing tracks unless they are also at times used as storage tracks. They are placed on all industry tracks where the grade toward the main line is such that a car could move when the brakes are off. Through the prairie country, which is subject to very high winds, this road places derails on all tracks where there is danger of cars being blown out on the main line, the entire matter being left to a considerable extent to the judgment of local officers. It is not the practice of the Southern Pacific to place derails on passing tracks and other tracks connected with the main line, but they are installed on such tracks wherever these are on a grade approaching a main line or at points in level territory where unusual conditions, such as high winds, prevail. It is also its practice to put in derails on short spur tracks where cars that are set out for loading ordinarily come close to clearance points to prevent cars moved by the shipper from fouling the main track. The Chicago, Milwaukee & St. Paul makes it a point to install derails generally on main line turnouts only and restricts their use to points where grades are such that cars could easily run out on the main line or be blown out by heavy winds.

INSTALLATION OF DERAILS AT TURNABLES, DRAWBRIDGES AND OTHER LOCATIONS

The general tendency of the railroads is not to install derails in turntable leads or at other special loca-

tions in yards or points not connected directly with the main line. However, in this respect the practice varies considerably on different roads, some installing derails in turntable leads, others at the foot of tracks leading to coal chutes, at box car loaders around breaker tracks or for the protection of shop buildings.

Among the roads making it a general practice to install derails on tracks leading to turntables and like places involving risks are the Illinois Central, the Erie and the Missouri, Kansas & Texas. Among other roads using them to a limited extent at such locations are the Lehigh Valley, the Chicago, Rock Island & Pacific, the Boston & Maine, the Baltimore & Ohio and the Colorado & Southern. The Lehigh Valley, the Rock Island and the Boston & Maine make it a practice to install derails on tracks leading to turntables and other special locations where the grade is unfavorable, where there is a possibility of engines running out on the main track or at points where accidents have occurred or are liable to happen. The Baltimore & Ohio and the Colorado & Southern have installed derails in a few special locations on tracks leading to turntables and at other points.

The New York, New Haven & Hartford makes it a practice to place derails at drawbridges. At these locations they are placed in tracks both with and against the direction of traffic. It is the practice of the Chicago, Burlington & Quincy to also use derails on tracks approaching drawbridges.

Some roads make it a practice to protect box car loaders, coal chutes and repair tracks. The only special locations apart from the main track on which derails are used on the Delaware & Hudson are at box car loaders around some of the breaker tracks, but this is indirectly a protection to the main track. A road in the central part of the country, road A in the table, installs derails on tracks leading to elevated coal chutes whether these tracks are connected into the main track or otherwise, but it is not the regular practice to treat other special locations in a similar manner. The Minneapolis & St. Louis uses derails to protect shop buildings beyond car repair tracks where these tracks run through the buildings, and a road in the southwest, road B in the table, uses derails on repair tracks.

Among the roads installing derails at special locations apart from the main track, such as industrial tracks or similar spurs which are located on bad grades or at points where cars are liable to foul the running tracks, may be mentioned the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the Southern Pacific Lines, the Philadelphia & Reading and the Nashville, Chattanooga & St. Louis.

In general, derails are not installed on tracks leading to turntables, but in a number of cases they are used to protect other special locations on the Delaware, Lackawanna & Western, the Southern Pacific, the Delaware & Hudson, the Chicago, Burlington & Quincy and the Canadian Pacific.

THE USE OF SPLIT POINT AND BLOCK DERAILS

Three classes of derails are used by the railroads replying to the circular. These types are the split point, the block and the lifting rail derail. The split point derail is used at places where high speed conditions prevail or on curves of a certain degree and at points where there must be no possibility of a train or car getting by. One objection to the use of this type is that a break is made in the track. The lifting rail derail is another type of high speed derail which can be installed without breaking the track, but it is used mostly within the limits of interlocking plants. The block derail is one that can be applied at almost any location without cutting the track and can be used advantageously in a large number of

places where speed or curve conditions are not too severe or when not prohibited by law. Some roads report the split point as standard and others the block type, but practically all use both kinds, depending on conditions, such as their location on a curve, their use on important passing tracks in high speed territory, the speed of equipment and where the type of derail is specified by law. In some cases the type of derail used on a siding is determined by whether it is a permanent or a temporary one.

Some of the roads make it a practice to use the split point type on main line tracks and on all tracks immediately connected with the main line and where high speed movements occur. Among these roads may be mentioned the Santa Fe, the Lackawanna, the New York, New Haven & Hartford, and the Louisville & Nashville. On these lines the block type derails is used for other locations. The Norfolk & Western uses the block derail except at places where it is prohibited by law, in which case the split point type is used, while the Los Angeles & Salt Lake uses a split point derail in locations that are

sharper than one degree, while road A does not specify any certain curvature for its use at such locations. On the Southern Pacific the block derail is used only where grades are less than one per cent; at points where grades are greater the split point type is employed.

The standard derail on the Northern Pacific is the split point, but the block derail is used in special locations. The split point derail was adopted as standard because the conditions are a little peculiar from those existing on roads in other parts of the country, as in the timber regions along the Northern Pacific, a great many temporary tracks are being built and remain in for a year or two. After they have served their purpose they are then removed. This road found difficulty in matching up material recovered from the derails used in the temporary tracks and many times the recovered material went to the scrap pile because of some missing parts. As these tracks are frequently needed in a hurry and many delays were experienced in getting and installing the derails, it was felt to be better practice to use the split point, as this is always available. Under other cir-

ROAD	Derails Used on Tracks Leading to Main Line				How Operated		Used in Special Locations		Type Used		Use in Automatic Signal Territory		Is Tendency Towards More General Use.	The Value Has Been Demonstrated
	Passing	Industry	Both Passing and Industry	Only Where Grade or Other Conditions Warrant.	Pipe connected	Hand Thrown	Turn-table Leads	Other Special Locations	Split Point	Block	Pipe-connected without Switch Circuit Controllers	Controllers Used on Hand Throw Derails		
A.A.&P.				Yes	Yes	Yes	No	No		Yes	Yes	Yes	Yes	No
A.C.&S.		Yes			Yes	Yes	No			Yes		Yes	Yes	Yes
B.R.	Partly	All new	Yes		Yes*	Yes	No			Yes	Yes(a)	Yes	Yes	Yes
C.O.P.					Yes	Yes	No	Yes	Yes	Yes*	Yes	Yes	Yes	No
C.P.	Yes			Yes	Yes	Yes	No	No	Yes	Yes*	Yes	Yes	Yes	Yes
D.A.				Yes	Yes	Yes	No	No	Yes	Yes*	Yes(a)	Yes	Yes	Yes
E.					Yes*	Yes	No	Yes	Yes	Yes*	Yes	Yes	Yes	Yes
F.					Yes	Yes	No	No	Some	Yes*	No	Yes	Yes	No
G.	Few			Yes	Yes	Yes	No	No	Some	Yes*	Yes	Yes	Yes	Yes
H.				Yes	Yes	Yes	No	No	Some	Yes*	Yes	Yes	Yes	Yes
I.		Yes			Yes*	Yes	Some	Some	Some	Yes*	Yes	Yes	Yes	Yes
J.					Yes	Yes	No	No	Some	Yes*	Yes	Yes	Yes	Yes
K.				Yes	Yes	Yes	Few	Few	Some	Yes*	Yes	Yes	Yes	Yes
L.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
M.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
N.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
O.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
P.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
Q.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
R.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
S.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
T.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
U.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
V.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
W.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
X.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
Y.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
Z.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AA.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AB.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AC.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AD.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AE.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AF.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AG.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AH.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AI.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AJ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AK.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AL.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AM.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AN.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AO.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AP.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AQ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AR.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AS.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AT.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AU.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AV.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AW.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AX.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AY.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
AZ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BA.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BB.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BC.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BD.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BE.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BF.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BG.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BH.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BI.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BJ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BK.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BL.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BM.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BN.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BO.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BP.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BQ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BR.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BS.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BT.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BU.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BV.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BW.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BX.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BY.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
BZ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CA.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CB.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CC.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CD.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CE.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CF.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CG.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CH.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CI.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CJ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CK.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CL.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CM.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CN.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CO.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CP.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CQ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CR.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CS.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CT.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CU.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CV.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CW.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CX.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CY.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
CZ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DA.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DB.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DC.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DD.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DE.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DF.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DG.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DH.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DI.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DJ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DK.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DL.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DM.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DN.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DO.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DP.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DQ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DR.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DS.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DT.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DU.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DV.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DW.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DX.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DY.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
DZ.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
EA.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
EB.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
EC.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
ED.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
EE.				Yes	Yes	Yes	No	Yes	Some	Yes*	Yes	Yes	Yes	Yes
EF.				Yes										

received indicated that 14 railroads use both pipe connected and hand throw derrails in automatic signal territory, 7 roads use pipe-connected derrails, and 16 use hand throw, while 11 report no automatic signal territory.

Where a pipe-connected derail is used in automatic signal territory some roads do not make it a practice to use the circuit controller operated by the derail inasmuch as the signal system is controlled through one located at the main line switch which operates the derail. As a safety measure and in order to indicate the position of the derail when it is not connected to the main line switch, but is handled separately a number of the roads use switch circuit controllers attached to the derrails. As an additional safeguard circuit controllers are connected to all derrails in automatic signal territory, whether these derrails are pipe connected or hand thrown on a number of roads.

THE USE OF PIPE CONNECTED AND HAND THROW DERRAILS

The practice of using a pipe connected or a hand thrown derail, like the use of the split point or block type, varies greatly on the different roads as revealed in their answers to the questionnaire. The standard practice on some roads is toward the pipe-connected type, while others incline toward the hand-thrown derail. Again, some roads have about an equal number of both types in service with no preference expressed, while the use of pipe-connected derrails on other systems has been discontinued for certain locations. Practically all the roads, however, have both types of derrails in service.

Among the roads making it a standard practice to pipe connect all derrails where they operate with main line switches are the Lehigh Valley, the Erie, and the Burlington. All derrails installed since 1916 on the Chicago, Rock Island & Pacific have pipe connections to the main line switch stands on all tracks connecting with the main line. The general practice on a line in the central part of the country, road G in the table, is to connect derrails by pipe lines to the main track switches on passing sidings and yard leads leading to the main track except in the state of Indiana. Derrails on station and industry sidings connected with the main track are hand throw. In the state of Indiana the law requires lights on non-interlocked derrails on passing sidings and on yard leads connected with the main track and on this road these derrails are not pipe connected to the main line switch, but are hand thrown.

The general practice of the Illinois Central is to use a hand-throw derail and only in a few cases are the derrails connected with the switch stands by pipes, while on the Missouri, Kansas & Texas the derrails are all hand thrown and a derail sign is also used to indicate their location. A very small percentage of the derrails on the Union Pacific and the Southern Pacific are pipe connected; it is not the practice of the Union Pacific to operate them in this manner, while the practice of pipe connecting them on the Southern Pacific has been discontinued. The Long Island has approximately 50 per cent of its derrails still pipe connected, but on all new work they are no longer connected in this manner, while the Chicago Great Western has taken out practically all pipe-connected derrails and maintains only those that are thrown by hand.

Approximately 95 per cent of the derrails on the Northern Pacific are of the hand thrown type, while on the Chesapeake & Ohio and the Minneapolis, St. Paul & Sault Ste. Marie probably 50 per cent of the derrails installed are pipe connected, the best being hand throw. The general practice of the Chicago & Alton is to use the hand-throw split point derail except on side tracks having a heavy grade descending to a passing track or main

line, in which case the pipe-connected derail is installed. The practice of the Canadian Pacific is to use a hand-throw derail except in the vicinity of interlocking plants or in other locations where it may be felt desirable to pipe connect them to switch stands.

THE USE OF DERRAILS AND THE VALUE OF THEIR APPLICATION

In view of the very general use of derrails as expressed above, the general opinion of the railroads is that the derail is a desirable safety device and while many of the roads have had no recent occurrences showing the worth of their application, derrails have, however, demonstrated their value in the past. The installation of derrails on the roads has prevented cars from moving out of sidings due to wind or grade or because the brakes were not properly set, or at locations where cars were moved by outside parties as at coal mines and like industries. The value received in protecting traffic and preventing damage in the past makes their use fully justified in the opinion of a number of the roads.

The number of derrails in service is increasing each year on the Chicago, Milwaukee & St. Paul, but no recent instances have occurred demonstrating the wisdom of their application. This road reports daily derailments having occurred due to the installation of derrails which would not happen if the tracks were not protected with them. However, the damage done by such derailments is generally not great and greater damage could result were the derail were the derrails omitted at such points. The tendency of the Rock Island is to have all tracks leading to the main line on which cars are placed properly equipped with derrails, while the Nashville, Chattanooga & St. Louis is extending their use and feels that their application on industrial tracks to prevent shippers from pushing cars beyond the clearance point alone justifies their use.

ROADMASTERS' CONVENTION NOTES

OWING TO THE ASSIGNMENT of M. Donahue, general roadmaster on the Chicago & Alton at Bloomington, Ill., to special service on maintenance of way work with the Railroad Administration at Washington and to the death of M. J. Greeney, supervisor on the Lehigh Valley at Buffalo, it has been necessary for the executive committee of the Roadmasters' and Maintenance of Way Association to select new chairmen for the committees on Roadway, Ditching and Drainage and the Conservation of Lumber in the Maintenance of Road Crossings and Signs. The committees are now constituted as follows:

Roadway Ditching and Drainage:

- J. P. Corcoran, roadmaster, C. & A., Bloomington, Ill., chairman.
- W. P. Wiltsee, principal assistant engineer, N. & W., Roanoke, Va.
- A. L. Kline, trainmaster, A. T. & S. F., Marceline, Mo.
- F. A. Nolan, division roadmaster, G. N., Breckenridge, Minn.
- L. Coffell, supervisor, C. & E. I., Mokena, Ill.
- J. H. Brooks, roadmaster, Me. C., Brunswick, Me.
- P. G. Glynn, roadmaster, I. C., Louisville, Ky.
- H. Ferguson, superintendent of track, G. T., Toronto, Ont.
- F. A. Denton, division roadmaster, St. L.-S. F., Lebanon, Mo.
- W. A. Bump, supervisor, B. & A., Pittsfield, Mass.
- L. C. Ayers, assistant division superintendent, N. & W. Crewe, Va.

Conservation of Lumber in the Maintenance of Road Crossings and Signs:

- P. M. Dinan, supervisor, L. V., Geneva, N. Y., chairman.
- A. M. Clough, supervisor of track, N. Y. C., Batavia, N. Y.
- D. C. McGregor, supervisor, B. & O., Pittsburgh, Pa.
- M. W. Murphy, roadmaster, M. P., St. Louis, Mo.
- J. H. Anger, supervisor of track, N. Y. C., Newark, N. Y.
- H. Berand, roadmaster, W. C. F. & N., Waterloo, Ia.

C. A. Joyce, supervisor, Erie, Paterson, N. J.
 C. H. Gruver, roadmaster, C. R. I. & P., Manly, Ia.
 J. B. Martin, supervisor of track, N. Y. C., Elkhart, Ind.
 J. H. Cummings, roadmaster, B. R. & P., Punxsutawney, Pa.
 John Johnson, supervisor, N. Y. C., Newburgh, N. Y.

Track Maintenance in Freight and Passenger Terminals:

L. M. Denny, supervisor, C. C. C. & St. L., Indianapolis, Ind., chairman.
 Geo. S. Brooks, roadmaster, T. R. R. A. of St. Louis, St. Louis, Mo.
 J. E. Wilkinson, roadmaster, C. & N. W., Chicago, Ill.
 Wm. Lawrence, supervisor, C. & E. I., Dolton, Ill.
 C. J. Coon, engineer of track, N. Y. C., New York.
 P. J. Mungavin, roadmaster, N. P., Duluth, Minn.
 J. B. Baker, supervisor, P. R. R., Philadelphia, Pa.
 D. McCooe, supervisor of track, G. T., Toronto, Ont.
 D. F. Corcoran, supervisor, N. Y. S. & W., Jersey City, N. J.
 J. J. Duffy, roadmaster, C. & I. W., Chicago.
 B. C. Dougherty, roadmaster, C. M. & St. P., Chicago.
 Wm. G. Shaner, supervisor, P. R. R., Philadelphia, Pa.
 J. E. Gallivan, general roadmaster, U. P., Kansas City, Mo.

Owing to the present heavy expenses of track maintenance because of the high costs of materials and labor, it has been decided to continue the study of the subject of Equation of Track Values. W. P. Wiltsee, principal assistant engineer, N. & W., has taken charge of this investigation.

Plans are being made for the Victory convention which will be held in the Auditorium Hotel, Chicago, on September 16 to 18, inclusive. The Committee on Arrangements has been selected as follows:

E. T. Howson, editor, *Railway Maintenance Engineer*, Chicago.
 Thos. Thompson, roadmaster, A. T. & S. F., Joliet, Ill.
 M. Burke, roadmaster, C. M. & St. P., Chicago.
 G. G. Austin, general roadmaster, C. J., Chicago.
 J. H. Reagan, superintendent track, G. T., Chicago.
 C. Johnson, roadmaster, C. B. & Q., Chicago.
 J. J. Navin, supervisor, Penn. Lines, Chicago.
 Wm. Shea, general roadmaster, C. M. & St. P., Chicago, and the Association Secretary.

RETURN OF THE RAILWAY REGIMENTS

THE RAILWAY REGIMENTS, organized and recruited among railway officers and men early in 1917, who were in the vanguard of the American troops arriving in France, are now returning rapidly to this country and are being as speedily demobilized. The Sixteenth Engineers, the Detroit regiment, arrived in

New York City on April 22, being later sent to Detroit for demobilization. This regiment was occupied in building freight classification yards in France, and took part in the fight in March, 1918, when the British retreated before the great German drive.

Two companies (C and D) of the Eleventh (New York) regiment have also arrived, the rest of the unit with its commander, Col. William Barklay Parsons, being scheduled to arrive later. This regiment was engaged in actual fighting before Cambrai in November, 1917, and also took part in the repulse of the Germans in March, 1918. The Twelfth regiment, organized at St. Louis, arrived in New York on April 26 and was sent to Camp Funston, Kan., for demobilization. The Eighteenth (San Francisco) regiment arrived in this country April 27.

As these regiments return, they are being accorded enthusiastic receptions by their former railroad associates and townsmen. Typical of these was the reception given the Thirteenth railway Engineers on its return to Chicago on May 12. Approximately 100,000 people banked Michigan boulevard on both sides as the regiment paraded in platoon formation. Employees of the six railroads centering in Chicago, from which this unit was mainly recruited, were organized in groups along Michigan boulevard to welcome the men. As the regiment turned into Michigan boulevard for their parade, engineers on the Illinois Central and other railroads in Chicago blew their whistles until the parade had passed from Victory Way on Michigan boulevard into the loop district. Flower wreaths were hung over the shoulders of Col. C. L. Whiting, in command of the regiment, battalion commanders and company officers, and a company of girls scattered roses on the pavement in advance of the men. Immediately after the parade the men were taken to one of the large hotels, where they were dined and entertained.

The Fourteenth Engineers, made up of employees of the principal New England railroads, were guests at a banquet in Boston on May 8, which is said to have been the most successful affair of the kind that has been held in any part of New England. The Fourteenth Engineers arrived in Boston on April 27, 30 officers and 1,486 men. Prior to the day of the general reception, each road had had an entertainment for companies connected with that road, and the general reception on the 8th filled a whole day, a picnic being held at Riverside, 11 miles from Boston, in the daytime.



Thirteenth Engineers Marching Down State Street, Chicago



PUTTING NEW BLOOD IN THE CARPENTER FORCES

Does the Present Offer Opportunities to Improve the
Personnel of the Bridge and Building Gangs?

AFTER MANY YEARS of inadequate wages the railway bridge and building forces find that they are now receiving a rate of pay equal to or greater than that to be obtained for the same class of work in most parts of the country outside of the largest cities and a few industrial centers. This situation has come about after a long period of low rates of pay to these men. As outlined below, during the past 25 years the most efficient carpenters have had every incentive to take up more remunerative employment outside of railway service. With these influences effective, certain forms of organization were developed the exact nature of which were dependent partially on the divergent nature of the work done on the railroads and partially on the character of men to be had for the wages which the railroads were paying.

This situation has been entirely changed in the short space of one year, and it is, therefore, but natural that there should be considerable speculation as to the present opportunities for improving the conduct of bridge and building work. This will apply not only to the kind of men employed, but also to the form of organization, the distribution of the work and other subjects of an allied nature.

With this statement of the situation with which the railroads are now confronted as it concerns the work of maintaining their structures, we present below three discussions of the opportunities which it offers, prepared by men in intimate contact with this class of work.

THE STORY OF RAILWAY CARPENTER WORK

By E. M. GRIME

Supervisor of Bridges and Buildings, Northern Pacific,
Dilworth, Minn.

As far back as 1875 the prevailing rate of pay for bridge carpenters—the most skilled men in the maintenance of way department—was 30 cents per hour. With some few exceptions, this rate remained stationary for the next 25 years and throughout this period it com-

pared very favorably with rates paid by building contractors and industrial enterprises. As a consequence, railroad officers were enabled to develop during this time a class of expert bridge and building men. In any emergency such as a wreck, a washout, or a fire, the bridge crews were the first to be moved to the scene of action and they stayed there until conditions were again normal. Each man was a tower of strength, loyal to the core, willing and able to work 24, 36 or even longer hours at a stretch if necessary, and was always to be relied upon. He was proud of the fact that he worked on a railroad and, once in the organization, preferred to stay there.

About 1900 this satisfactory condition of affairs began to change and not at all in a manner advantageous to this department. Great prosperity in industrial lines created a strong demand for skilled labor, especially in the building trades, and contractors soon increased the rates of pay and began to bid for the efficient men on the railroads. Reasonable wage advances at this time sufficient to meet advancing living costs might have held the organization intact, but, unfortunately, legislation adverse to the railroads and agitation for reduced freight rates, when increased rates were really necessary, compelled the managements to hold down wages wherever possible. The result was that the men in the maintenance department, considering responsibility, gradually became the poorest paid on the railroad and their rates fell far below those paid for corresponding service elsewhere. Improved living quarters and liberal pass privileges were some of the means tried in efforts to hold the men in railroad service, but regardless of these, many of the best men felt that their services were apparently unappreciated and went where they could nearly double their incomes.

In 1917 conditions had become so serious that it was a problem to find men suitable for promotion to foremen and the pay of the latter hardly compared favorably with that of common carpenters elsewhere. Although some small increases were granted it was not until 1918, with the advent of the Railroad Administration and the promulgation of General Order No. 27 and its supplements,

that this class of employees were again placed on a basis comparable with similar work elsewhere.

The enormous demand for skilled labor in shipyards, cantonment construction, etc., during the past season made it impossible to strengthen the maintenance of way forces to any extent with skilled men, but the roads entered the present year with decidedly improved conditions in the labor market, and as the good rates of pay on the railroads become generally known many experienced men are again seeking employment and there is, within a certain limits, a fine opportunity to improve the personnel in the bridge and building department.

Through agreements with the labor organizations conditions of employment are now so regulated that the roads are practically compelled to keep most of the men they now have, regardless of whether or not they are strictly efficient. It is unfortunate that this kind of regulation follows a period of extreme labor shortage when the roads were forced in many cases, in order to complete essential work, to hire men who, under other conditions, would have received little consideration. Our problem, therefore, at this time, is to train the men already in the service to become strictly efficient and gradually improve the service by replacing any who may drop out, partly by young men of good experience and partly by inexperienced young men of good physique suitable as apprentices. Those old men in the service who are really becoming too old to be efficient are a serious problem under the new order of things and it seems desirable that some sort of a pension system be devised by which they can be retired. Fortunately, many will automatically drop out, but the few who remain, if not otherwise taken care of, often become a serious drawback to the efficiency of the crew.

The higher rates of pay have probably come to stay and it is now more essential than ever to select only the best of men and see that the crews are well balanced for the work they have in hand. In the past it has been customary to call on the bridge and building carpenter for so many different duties that he has been more of a "jack of all trades" than anything else, but with the present recognition of these men as a class there must be some curtailment of this practice in order to confine the carpenter to his carpenter work, the laborer to his work, the brick mason to his brick work, etc.

In any carpenter crew it is a good plan to have at least two men who have had experience on bridge work and in a similar manner the bridge crew can with advantage contain one or more good house carpenters, so that at times either crew can be used to advantage on work which the other would ordinarily specialize on. On most divisions, if some thought is given to the selection and arrangement of the work, there is sufficient to keep both carpenter and bridge crews working to advantage throughout the entire year and it adds greatly to efficiency if the carpenter crews can be assigned continuously to house carpenter work, while the bridge crews specialize in bridge maintenance, construction and other heavy work of that nature. The proportion of each class of men desirable in any particular crew depends on the kind of work being handled most of the time. In a carpenter crew of eight men usually four first-class carpenters, two second-class and two helpers can be used to the best advantage for ordinary line repair work. Some experienced foremen claim they can get better results with nothing but first-class men, but if the cost of the work is put strictly up to them it will generally be found that their objection to helpers or apprentices is largely due to their inability or unwillingness to teach others. In the ordinary crew of 10 men working on main line bridge repairs and renewals not more than two helpers can usually be em-

ployed to advantage. The differential of a few cents per hour in the rate of first and second class carpenters is usually more a matter of age in the service than of difference in ability.

In seeking greater efficiency from our crews, as we must in order to carry out any work at reasonable cost under prevailing wage rates, it is best at this time to place a few high class carpenters in crews where needed in order to raise the standard of work quickly and at the same time use about an equal proportion of bright young apprentices who can see the opportunities that exist for promotion and who will soon develop into all around reliable bridge and building mechanics.

THE FORM OF ORGANIZATION IS IMPORTANT

By R. H. REID

Supervisor of Bridges, New York Central, Western Lines,
Cleveland, Ohio.

While the advance in wages of the bridge and building forces has benefited the men, the general advance in wages of all kinds has, to a certain extent, offset that received by our men, and I have not noticed any appreciable difference in the class of men making application for work. In fact, very few men are applying for work, and as the work on our line has been curtailed, we not only have been employing no new men but have found it necessary to reduce the force which we had. All work not absolutely necessary for this season has been cut off and we are doing only necessary maintenance work and such other special work as cannot be postponed.

In regard to the advisability of hiring experienced men or bright young fellows without experience, I think we get better results by hiring young men without experience, as they are generally more receptive to instruction and quicker to learn than the so-called experienced men, whose experience, in many cases, has been obtained under conditions entirely different from those prevailing on our line and whose methods of work are different from ours, and more difficult to change than in the case of younger men. The young men also are generally more active and have more years of service ahead of them, can generally be used on all kinds of work, and by proper training under first-class foremen, and with men experienced in our methods of doing work, can become experts in each line of work.

For ordinary bridge and building work a gang of 10 or 12 men is large enough, and can do the maintenance work on small iron and ordinary wooden bridges, as well as buildings and general carpenter work, and can be kept employed continuously during practically the whole year by arranging to take care of certain classes of work during the summer, when warm weather and low water conditions in streams are needed, while other work, such as tie renewals and much building work, with which the weather will not interfere, can be done in winter. On our line where the bridge department forces are separate from the building department, we have always arranged our bridge work so as to keep at least a moderate force employed steadily during the winter on work which can be done then as well as at any other time, and in that way always have a force available for use in case of emergency or special jobs of any kind.

The question has frequently been raised in some quarters, whether it is not practicable to do all bridge work during the season of moderate weather and comparatively long days, and lay off the force during the winter, when the weather is unseasonable and the days are short. One objection to this is that in case of emergency, when all men are laid off, it takes considerable time to get a force of men together to make repairs. Another objection is

that if the men are laid off in the winter they are apt to take up other lines of work where they can be more steadily employed and are not available when we need them in the summer. It is difficult, if not impossible, to maintain a good, effective working force unless we can retain at least the best men practically the entire year.

In organizing a gang, the proportion of mechanics and helpers will depend largely on the class of work they are to do. If the work covers the framing and erection of ordinary trestle and frame bridges, the construction of iron and concrete pipe culverts, the supporting the track with temporary structures for constructing sewers, water mains and other facilities under the tracks, and general maintenance work, a gang consisting of about one-half mechanics and one-half helpers can handle the work economically. If the gang is to do iron bridge work, especially the erection of large structures, it may, of course, need more than 12 men in the gang, depending on the size of the structure, but even in this a proportion of 50 per cent helpers with 50 per cent mechanics can be used, as there is much labor work in this kind of construction as well as skilled special work.

Where the work can be so arranged it is preferable to keep the men employed within a reasonable distance of their homes, so they may be home at least every Sunday, and may be able to get home in reasonable time Saturday evening and leave home either late Sunday night or Monday morning. If trains run so that men can live at home and get to and from the work without too much loss of time, this arrangement is preferable to maintaining boarding cars, or camp cars, as they are sometimes called. This can best be accomplished by combining bridge and building, and small concrete jobs on a division, and taking care of them with the maintenance forces, with the division supervisor in direct charge of the work on each division. For the larger iron jobs and special work it is generally desirable to have floating gangs specially equipped for handling such work and move them from place to place on the various parts of the road where those jobs are to be taken care of.

In order properly to co-ordinate all the work and to take care of the jobs when they can be done to best advantage and with the least movement of men and equipment over the road, a general supervisor or general superintendent of bridges should have authority covering the entire line. The general supervisor also should make an annual inspection of all structures to determine all renewals and major repairs. The division supervisor can, in most cases, determine minor repairs or ordinary maintenance. For taking care of cabinet work and the finer kinds of building work, it is probably desirable to have at least one gang specially equipped and trained for that kind of work, or if that is not practicable, to have a few men on each division for that work, the number of men depending on the amount of that kind of work to be done.

THE MEN MUST BE COMPETENT

By G. W. ANDREWS

Assistant to General Superintendent Maintenance of Way, Baltimore & Ohio, Baltimore, Md.

It has always been a matter of free discussion, both pro and con, as to the policy of employing young men without experience in gangs for bridge and building work. For bridge work I have always felt that it was beneficial to the railroads to organize the gangs with approximately 40 per cent as helpers, selecting from among the laboring class or others available the brightest young men obtainable, placing them in a gang of bridge men with instructions to the foreman to see that they were given every possible opportunity to learn the work and at the same time

"hold up their end," with the understanding that they would be in line of promotion for position as carpenter and foreman.

This has always been the policy of the Baltimore & Ohio, and has in many cases proven very valuable, as some of our best master carpenters are men who started their careers as helpers in bridge gangs. It is necessary that a portion of the bridge gang be composed of skilled men and I do not believe that we should under any consideration fail, wherever possible to do so, to maintain at least 60 per cent of skilled men. These skilled men should be selected from the helpers when found competent, but when not able to do so we should employ when necessary competent men from the outside.

It is not good policy nor good economical practice to organize all around gangs to be used on both buildings and bridges, as the character of the work is so entirely dissimilar that the bridgeman rarely becomes an efficient house carpenter and the house carpenter, without special training, is of very little use when put on bridge work. The character of the work on bridges is of a heavy type and has a tendency to make a man careless on the lighter work of buildings and I believe that practices of this kind should not be encouraged.

It is doubtful if gangs organized to do all classes of work could be properly distributed to maintain good conditions, as the work on bridges is, as a rule, continuous and absolutely necessary to maintain safe conditions and should be given the preference.

The character and type of men now available for this class of work from outside sources is, as a rule, very inefficient, owing primarily to the great demand for labor of this character on work other than railroads, but I believe that this will assume more normal proportions in the near future. While it would naturally be assumed by those who have not given this matter much study that the answer is—train young men, and while I also believe fully in training young men for future promotions, it is a fact that, because of the nomadic spirit of the average bridgeman, about 50 per cent of the young fellows will leave the service about the time they become most useful. This has been our experience for a number of years, yet I believe the resultant effects of training young men will help to obtain better efficiency in the gangs than we could possibly obtain by depending entirely on untrained men or obtaining them from outside sources.

LARGE TIMBER TREATING RETORTS

THE CONSTRUCTION of what are believed to be the largest timber treating retorts ever installed in the United States has just been completed for the Chicago & North Western by the Wm. Graver Tank Works,



Retorts Loaded for Shipment

Chicago, and they have been shipped to the wood preservation plant of that road at Escanaba, Mich. These retorts are 113 ft. long and 6 ft. 2 in. in diameter. Their combined weight is approximately 180 tons. They are built to withstand a working pressure of 175 lb. The doors, which weigh 6 tons each, swing on roller bearing hinges.

SPOTTING UP VERSUS SURFACING CONTINUOUSLY

Four Trackmen Express their Ideas on Best Solution of Problem Now Confronting Maintenance Men

SHOULD A FOREMAN give first attention to the low spots which have developed as the track comes out of the winter, or should he work continuously from one end of his section to the other, completing the surfacing as he goes? This is a problem which confronts a section foreman every spring, but it is of unusual significance this year. The track has been subjected to unusually heavy traffic during the past year and it has not received the normal amount of rail and ties, while the shortage of labor has been present here as in all other industries. The result has been that the track has come out of the winter this year in a weaker condition than usual and it has required a correspondingly greater amount of attention.

With an adequate supply of labor and with the outlook for increased quantities of ties and rails in the near future, the maintenance of way department is now endeavoring to bring the tracks back to their normal pre-war condition. For this reason the four discussions which appear below, prepared by men of long experience in track maintenance in various parts of the country, are of particularly timely interest now.

SURFACING OUT OF FACE PREFERRED

BY W. F. RENCH

Probably very few passengers, other than officers of the road, give any thought whatever to the riding of the track, unless a jolt or lurch of the car attracts attention. Comfortable traveling at a high rate of speed has come to be taken as a matter of course. Although all roads have suffered in physical condition through the lean maintenance of the past two years, it is a welcome fact that the smoothness or safety of travel has not seriously deteriorated. This is due in part to a most favorable winter having intervened, and to a notable absence of storms. It is also and mainly due to the policy generally pursued of maintaining line and surface in preference to all other features. Thus, at no time has the track been allowed to become excessively rough.

The writer, who has been engaged the last two years on both the construction and maintenance of tracks by contract forces, has occasion to travel daily over a section of road which has had to carry an extraordinarily heavy traffic, in spite of a maximum of handicap through labor shortage. The stretch of road was in the heart of the munition-making districts, and at the signing of the armistice had 75 men distributed over 60 miles of line, mainly four-track railroad. Having been in touch with the supervisors frequently, and coming into contact with many section foremen, he feels that he is in a position to give a fairly correct index of the opinion prevailing in a certain section of the East with regard to the important subject under discussion. By virtue of being not only a servant of the road, but a patron as well, he is able to offer his views both from the standpoint of the commuter and the maintenance man.

The section forces have recently gone to a 10-hour day in several places, and have had not only accessions in number, but a slight improvement in the quality of men, although there is still much to be hoped for. They are now confronted with the problem of making the repairs that will show the greatest possible return, both immediately and for the future. It is believed that a comprehensive

program of surfacing is in order rather than skimming over the rougher spots. This is confirmed by two principal points: the favorableness of the season and the inexperience of the new men. The season is favorable in that no long continued wet spell has occurred to complicate the surfacing plan. Such a weather condition works a double handicap to the track, for it not only tends to make the roadbed soft in spots and accentuates indifferent surface, but it keeps the repair forces off the track and confines such surfacing as may be done to the vicinity of the tool house. The continuing inefficiency of labor is in itself a bar to detailed surfacing. In past times a joint and the adjacent ties that were loose could be tamped in a permanent fashion, because the experienced labor needed to do the work was at hand. Now better results are obtained from the newer men when surfacing out of face, whether it is done with the tamping pick or the air machine.

It is well known that track raising has been practically suspended since the country has been at war. There are many places where surfacing of the low joints is only of temporary effect. When the bed is hard and inelastic, nothing but the raising of the track out of face will afford relief. In view of the necessities of the case the raise will be as little as can be tamped effectively. The raising will also be done first at the points which most require it. Thus it may be possible to cover the worst of the center-bound condition during the present season. Along with the raise a moderate renewal of the ties will be necessary. Indeed, these may well be, and in some cases must be, made in advance of the raising. It does not seem desirable to establish an extensive program of tie renewals for this year. It is more important to get the road in good line and surface along with safe repair in the item of ties.

In normal seasons a general surfacing over of the rough spots inaugurates the summer program. Then follows a period of intensive tie renewal, suspended at proper intervals for necessary surfacing and policing. Lastly, a general surfacing and policing precedes the advent of cold weather. The emergency of the war period has operated to extend the scope of the several parts of a season's work. Thus, the general surfacing this year may well be the principal work undertaken. He is a true optimist who hopes to bring the tracks before 1919 closes to the excellence of 1917, but it is feared his optimism will prove of the Micawber variety. It is a well-known fact that several seasons are required to recover the ground lost through one or two years of restricted maintenance.

Just as there are exceptions to all rules, it will be necessary to introduce along with the general facing a certain amount of attention to the rough spots. These will be drawn to the attention of the foreman by his supervisor as he goes over the road on his line and surface tests, not as orders to be carried out immediately, but as information to the end that a joint beginning to get low may not become a source of danger, or even a cause of complaint. An efficient track walker, with a man delegated to his assistance, will take care of many such points and avoid a diversion of the gang. It certainly does not make for efficiency to employ the entire force on such work when a few men would suffice. The full force will have to be kept busy.

It must not be assumed that picking up low joints is at

no time important work. Following the breaking up of a severe winter, or after a heavy or long continued wet spell, it is highly desirable to skim over the rough spots and this may be necessary for safety, particularly on branch lines with sharp curves and short run-offs made at a limit close to safety. Skimming over the track at other times sacrifices valuable time and delays the development of the comprehensive program of repair, which would appear now to be the main business in hand.

SURFACING THROUGH TENDS TO NEGLECT

By E. R. LEWIS

Picking up low spots, or lifting out slacks in track, are phrases which indicate more clearly the exact meaning than surfacing through. Surfacing has been confused with lifting track out of face, or bringing new track into surface for the first time, which is beside the question.

Each summer season brings the trackman face to face with the problem of either eliminating short, low spots in track as rapidly as possible over his entire territory, so that throughout the season he may have a good riding surface, while the general track maintenance work is being done; or of allowing these surface defects to go unremedied until they are reached in the season's maintenance program, which has for its object the placing of track in prime condition for the year.

During the winter and spring, especially in climate where frost is sufficiently severe to cause track to heave, many short, low spots appear in track. These must be shimmed. Even where frost is not encountered, wet weather causes low spots. Unless these inequalities are eliminated by bringing the track to fair riding surface as shims are changed or removed, rough track results, and in soft bottom becomes worse as the season progresses.

On the other hand, if a great deal of heavy lifting of track is done, the general surface is disturbed, resulting in more harm than good, and delaying the season's program. Also, if low spots are picked up before ties are replaced, the work must to a great extent be done over again when surfacing through. It is this last consideration which makes many trackmen unwilling to do enough work on low spots ahead of the surfacing program to keep a fair riding track.

A prominent chief engineer once said that he would guarantee a 30 per cent increase in track excellence if he could make all his trackmen forget the meaning of the phrase "surfacing through," which was made an excuse for all manner of daily neglect in care of track. If the track defects are to await the season's surfacing through, obviously there will be excellent track but once a year—at the end of the rehabilitation season. This method is redolent of the old scheme of making dirt highway by plowing the ditches and casting the sod into the center for a crown once a year. The result was invariably a road full of ruts eleven months in the year, and full of slants and sod during the twelfth month.

Experience seems to have proven that any transportation line, be it bridle path or class A railway, should be maintained as nearly as possible to the same standard of excellence the year round. To this end, low spots should be picked up just as early and rapidly as possible, with the minimum of work necessary to preserve a good riding track. To do this requires the judgment of the experienced trackman, well acquainted with his territory and with the vagaries of the different classes of ballast and bottom under his track. He must know "how it will act" and where each hour's labor is most necessary.

His daily attention, and occasional day's work must be put on the various defects incident to traffic and weather

while carrying out his summer stunt of laying by his track for the winter. Otherwise he is guilty of deferred maintenance. If his ties come to him late in the season the leaving of low spots till surfacing through is done is all the more impracticable.

CONTINUOUS WORK MOST EFFICIENT

By J. W. POWERS

Supervisor, New York Central, Rochester, N. Y.

Owing to the increased traffic, as well as the shortage of labor, which existed during the period of the war, trackmen are this spring encountering new problems as well as being confronted with old ones in greatly intensified forms. Under these universal conditions, opinions differ as to the proper method of procedure in order to obtain the desired results in securing good riding track. Some are undecided as to whether they should do continuous work before going over their track or repair the rough places first.

Maintenance of tracks depends upon many details and it is careful attention to these details with systematic and methodical work which can alone bring about the best results. In order that the details of track work may be fully appreciated and properly attended to, it is of prime importance that this work be reduced to a routine. When the regular repair work is going on, it should be prosecuted with the idea in mind of thorough substantial work and each day's work should be complete in itself that there may be no excuse for retracing it in a few days or weeks.

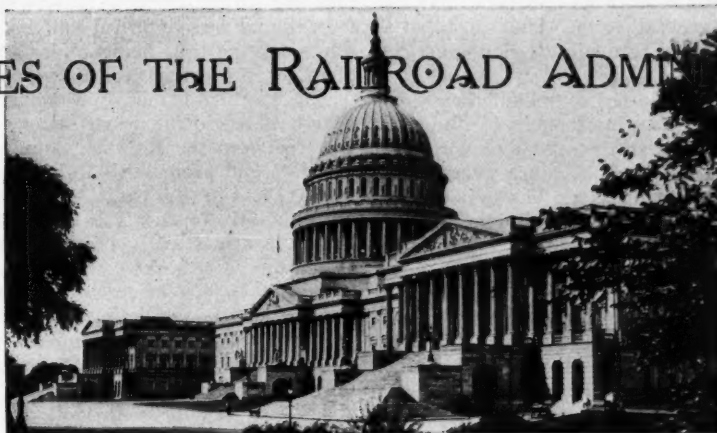
To do continuous work as outlined above, track should be equal to the demands made upon it; that is, it should have good rail and ties, a thoroughly drained and well ballasted roadbed and one that will remain in nearly normal condition, both summer and winter, so that track will not settle and puddle when the frost comes out in the spring or during heavy rains of the open season, thus leaving bad places to be constantly looked after at a time when general track work should be in "full swing."

There are very few roads where such a state of perfection has been attained as will hold track in a normal condition of surface and line the entire year. This is particularly true in the north temperate zone, where it is usually necessary to give track a general overhauling once in every year through what is known as a track season. The condition of line and surface is usually the poorest just previous to this season, which commences in the spring or early summer months. Therefore, if rough spots are not taken care of until reached during the process of general repairs, considerable time will have elapsed before some of them receive attention. Since the longer rough track remains untouched the worse it gets, there will be correspondingly greater expense to surface it finally. It should be the aim of track men to preserve at all times as smooth riding track as possible with subsequent minimum wear on track and rolling stock.

It seems to me that, with due regard for safety, comfort and economy in track maintenance, before commencing general repairs it is better to go over track and make necessary repairs to bad spots, devoting only enough time to get the track in fair riding condition. After the rough spots have been taken care of, general track work should begin. The portion worked over each day should be finished in every respect, tie renewals made and track gaged, surfaced, lined and dressed off. The work should be done in a thorough workmanlike manner; in other words, completed and put in such shape that it will not have to be gone over for at least another year. Any departure from this method is sooner or later apparent in deteriorating track.

ACTIVITIES OF THE RAILROAD ADMINISTRATION

Maintenance
Budgets
Are
Receiving
Further
Study



Director
General
Has
Ordered
200,000 Tons
of Rails

“THE RAILROADS will be handed over to their owners at the end of the calendar year.” This statement, made by President Wilson in his address to Congress on May 20, definitely ends the uncertainty regarding the duration of the period of federal control, the possibility of government ownership having ceased to exist some time ago. With this limit before it, Congress is expected to give increased attention to the passage of legislation, which must necessarily precede the return of the roads to their owners if they are to be enabled to operate in a solvent condition.

Students of the railway problem are drawing closer together in their solutions. The most important contributions to this subject during the past month were presented before the annual meeting of the Chamber of Commerce of the United States on Wednesday evening, April 30, when Walker D. Hines, director-general of railroads, Senator A. B. Cummins, prospective chairman of the committee on interstate commerce, and Samuel Rea, president of the Pennsylvania Railroad Company, spoke.

Mr. Hines advocated the compulsory consolidation of the railroads of the United States into from 12 to 20 competitive systems, combining the strong and the weak roads in such a way as to build up systems of relatively similar strength. These roads would be given official capitalizations on which a moderate return would be guaranteed by the government, with a division between the owners and the government of the profits earned beyond the guarantee. The government would be represented on the boards of directors and some of these government directors would also be made members of government regulating bodies.

The plan advocated by Senator Cummins is very similar to that of Mr. Hines.

Samuel Rea advocated the granting to the roads of revenues on which their credit can be strengthened and new capital attracted; concentrated responsible national regulation; authorization of the consolidation of roads and reasonable co-operation in facilities, equipment and train service, and regulation of security issues and wages. He opposed strongly any guarantee of earnings as opening the way for political interference and leading ultimately to government ownership.

The deficit of the Railroad Administration for the first three months of 1919 was \$192,000,000, according to a statement authorized by Director-General Hines. Adding this to the deficit for 1918 makes the total deficit up to April 1 for the 15 months since the government took over the roads \$418,000,000. The net operating income for the Class 1 railroads and the switching and terminal

companies for March was \$10,924,000, or 82.5 per cent less than that for March, 1918. The three-year average for March was \$68,251,000.

THE MAINTENANCE PROGRAM

Problems connected with the 1919 maintenance of way program constituted one of the principal topics for discussion at a conference held at St. Louis on May 19 between Director-General Hines, who has been making an inspection trip into the Southwest, and the seven regional directors. C. A. Morse, assistant director of the Division of Operation, in charge of the maintenance of way matters, was also present at the meeting, which took up, among other things, the available figures showing the rail and tie renewals in 1918 as compared with the test period and with the 10 years preceding federal control in connection with the requirements for this year.

As stated in last month's issue, the instructions regarding the preparation of the 1919 maintenance budgets, which were contained in circular No. 28 issued by the Division of Operation, on March 1 were suspended because of the large amount of clerical work required, but the general purpose of the instructions governing the amount of maintenance to be done this year has not been changed. The latest instructions on the subject are contained in the following letter addressed to W. T. Tyler, director of the Division of Operation, to the regional directors in the latter part of April:

“You are already advised of the terms of the standard contract as to upkeep and in circular No. 28, Division of Operation, will be found extracts from the contract. I presume that in pursuance of the director general's letter of February 25 you have carefully studied the maintenance on each railroad for the test period and for 1918. Please have each federal manager as soon as possible submit to you the 1919 program for his railroad, on the basis that the maintenance of road and structures shall conform as closely as possible in the amount of labor and material used to the established average annual maintenance during the three-year test period, but with regard to safe operation of properties under your charge, and to that end ask him to report promptly his program for the calendar year 1919, divided as follows:

- “1. Number of ties.
- “2. Cubic yards of ballast.
- “3. Tons of rail and fastenings.
- “4. Value in dollars of ties, ballast, rail and fastenings renewals.
- “5. Value in dollars of renewals or necessary replacement of bridges, trestles, or culverts.
- “6. Value in dollars of work necessary in connection with proper maintenance under present conditions of track, buildings, fences, ditches, signals, telegraph and telephone lines and other items of maintenance. The cost under this item to be expressed in one sum and generally should not exceed the average spent for the purpose during the annual average of the test period equated as to values of labor and material determined by each road.”

In order that the program from all railroads may be submitted in the same general form, standard reports have been prepared on which the information must be submitted.

The various regions are expected to submit their final budgets in accordance with these instructions by June 15, but meanwhile all of them have practically completed working programs based on previous more general instructions which the regional directors, recognizing the necessity for making the upkeep correspond to that of the test period, have each worked out in their own way, pending the compilation of the formal budgets. Therefore the actual maintenance work is not being delayed by the rather complicated process of preparing the formal budgets, and the final figures when completed will serve as a check for the guidance of the roads in completing the year's work. The Southwestern region has worked out a complete program for each road, based on an equation of material and labor costs. The Central Western, North Western and Allegheny regions have worked out their programs on the basis of man-hours so that the average number of man-hours for 1918 and 1919 will equal the average for 1915, 1916 and 1917. This basis does not take into account the material factor, but is regarded as affording a practical yardstick.

The recent trips over a large part of the railroad systems made by various members of the Railroad Administration staff have given them a much more optimistic impression regarding the physical condition of the railroads than is gained by listening to the complaints that are frequently made and have convinced them that generally speaking there has been comparatively little under maintenance except for the shortage of ties, while many roads, particularly some that, because of their financial condition, had deferred maintenance before federal control, are said to have improved their condition and to have approached more nearly their own standards than before. In some instances, it is declared, the fact that rail and tie renewals were not being carried on to the usual extent, gave an opportunity to do more work than usual on surfacing and improving the roadbed.

Bids were received up to May 17 on 200,000 tons of Bessemer and open hearth rail, in sections ranging from 80 to 135 lb. per yard, i. e. b. cars at mills, delivery on same to be completed not later than July 1. On May 23 it was announced that orders had been placed for this tonnage of open hearth rails, divided between the Carnegie Steel Company, the Illinois Steel Company, the Tennessee Coal, Iron and Railroad Company, the Colorado Fuel & Iron Company, the Bethlehem Steel Company and the Lackawanna Steel Company. No mention was made of the weights specified. The orders were placed at the price quoted by these companies of \$47 per ton, which was the same as that approved by the Industrial Board of the Department of Commerce concerning which there has been so much controversy. With one exception, the bids were uniform in all respects, both as to price and conditions of manufacture. The Midvale Steel & Ordnance Company submitted a bid \$10 higher than the others.

In placing the order Director General Hines issued a statement that he had ordered these rails in view of the immediate needs of the roads, not only without approval of these prices, but with emphatic disapproval of them and the manner in which they had been established. He stated that the action of the manufacturers in making uniform bids had been taken under the leadership of the United States Steel Corporation as indicated by a statement by Judge Gary that it was maintaining strictly the Industrial Board price. The Director General said fur-

ther that he considered it was more to the public interest to withhold this approval and if necessary to pay such prices for the time being under protest, than to endorse them for the entire year as proposed by the Board.

The quantity named is a smaller tonnage than would have been asked for if satisfactory price had been agreed upon between the Railroad Administration and the steel interests and probably is to be regarded as a test of the market as the Railroad Administration will require a much larger tonnage this year in order to make good on its contract with the railroads regarding upkeep. While the records show that an average of approximately 1,500,000 tons of rail a year was used for renewals during the 10 years before federal control, and approximately 1,350,000 tons during the three-year test period, only about 1,100,000 tons was used in 1918 and until now the Railroad Administration has not placed any orders for rail since it took over the roads nearly a year and a half ago. The rails used last year are those which had previously been ordered by the railroad companies and while some of the orders were redistributed so as to make delivery to railroads whose companies had not placed orders, that practice was discontinued after January 1 this year. Since then the steel companies have declined to deliver rails ordered by one company to other railroads and while the Railroad Administration might take the rail after it has been delivered for use on another line, this is impracticable in most cases because of the difference in rail standards on different lines. Where different roads agree as to the rail section they use there are usually differences in the drillings. As a result, while the steel companies have been delivering rail this year at the rate of 35,000 to 40,000 tons a week, it is going to the roads which originally ordered it and many of the roads which have not placed orders in advance are said to be badly in need of rail. On May 1 there were outstanding orders for approximately 435,000 tons.

The request for competitive bids on rail was sent out by the Railroad Administration on May 10 after a conference on May 8 at New York, at which the representatives of the Railroad Administration suggested a price of \$41.37 for rail, but the steel interests insisted that further reductions in steel prices below those approved by the Industrial Board of the Department of Commerce could not be made without decreases in the cost of production which would necessitate a lowering of wage rates. The failure to reach an agreement and Director-General Hines' announcement that he would ask competitive bids marked the collapse of the price stabilization plan inaugurated by the Department of Commerce and the resignations of the members of the board were accepted by Secretary Redfield on May 9.

ORDERS OF THE CENTRAL AND REGIONAL DIRECTORS

In order to expedite the consideration of applications for industrial sidings as a means of encouraging new business, the director of the Southwestern region has asked federal managers to present the matter to him by telegraph, indicating the extent to which the administration will secure any benefit during 1919.

The director of the Division of Purchases has instructed that each railroad shall ascertain before making an order for the purchase or manufacture of material, that such material is not available on other lines. The roads are instructed to furnish their regional purchasing committees with monthly lists of excess material on hand, which will be matched against orders before they are filled.

The Eastern regional director in Circular 2700-A-714

specifies the manner in which interest shall be computed during construction on additions and betterments to railroad property where payment is to be made out of federal funds. It is stated that the rate is to be six per cent and that it applies to work done since December 31, 1917. No interest is to be charged on work costing \$1,000 or less or which is completed in one month.

OILING TRACK BOLTS AND JOINTS

In circular No. 206, the director of the Southwestern region wrote to the federal and terminal managers under his supervision on April 30 regarding the oiling of track joints and bolts as follows:

"Recent canvass of the Southwestern Region discloses that most of the larger roads have adopted the practice of applying crude petroleum or other cheap grade of oil to rail joints and bolts, not only when first applied, but also to those in place; first, however, cleaning off accumulations of rust and dirt before the application of oil. Where the oil has been applied, it has been uniformly reported as adding to the life of the joints and bolts due to the protection afforded against brine drippings and rust.

"One large railroad system located outside the Southwestern Region has reported that 30 per cent is a conservative estimate of the saving in the number of bolts required for renewal purposes where oil is systematically used, and a 40 per cent reduction in labor cost of replacing and tightening bolts. In view of the excellent results which have been secured, I believe this practice should be made uniform on railroads in the Southwestern Region, and the following methods appear to be in most general use:

"1. The oil should be applied to new angle bars and bolts by dipping them in the oil before they are applied to track. It is good practice to go over the joints and tighten the bolts within one week after oiling, although it has not been found in practice that the oiling of the joints and bolts has a tendency to cause the nuts to loosen to much greater extent, if any, than has been found where oil has not been used.

"2. It has generally been found sufficient to make reapplication of oil to angle bars and bolts, which were oiled when first placed in track, in about six months, and to continue this practice semi-annually; the time for the oil depending upon climatic conditions and the amount of brine drippings to which the track may be subjected.

"3. Application of oil to joints and bolts in track may be made with old paint brushes or some similar method and should require not to exceed one barrel for ten miles of track. Oil should also be applied to these joints about twice a year.

"It is not the intention of this circular to instruct that on roads where the practice of oiling track joints and bolts has not previously been in effect that this work be undertaken for the entire property at one time, but to suggest that in connection with other maintenance work the joints be systematically oiled so that within the working season the entire property may be covered and that the practice of oiling joints once established shall be continued."

PORTLAND CEMENT PRODUCTION IN 1918

COMPLETE STATISTICS of the output of hydraulic cement in 1918 compiled under the direction of Ernest F. Burchard of the United States Geological Survey, Department of the Interior, indicate a marked decrease from the output in 1917 and show that the production of Portland and other cements in 1918 was the lowest since 1909. The shipments of Portland cement in 1918 amounted to 70,915,508 bbl., valued at \$113,153,513, compared with 90,703,474 bbl., valued at \$122,775,088, in 1917, a decrease in quantity of 21.8 per cent and in value of 7.8 per cent. The production in 1918 was 71,081,663 bbl., compared with 92,814,202 bbl. in 1917, a decrease of 23.4 per cent. The stocks at the mills increased from 10,353,838 bbl. in 1917, to 10,453,950 bbl. in 1918, or 1 per cent.

The average factory price per barrel for the whole country was \$1.596 in 1918, compared with \$1.354 in 1917, an increase of 24.2 cents, or 17.9 per cent. The prices in these two war years are the highest that have

been realized for Portland cement since 1898 and 1899, when they were, respectively, \$1.62 and \$1.43 a bbl. The lowest average price, \$0.813, was recorded in 1909 and 1912. The exports of hydraulic cement from the United States in 1918 were 2,252,446 bbl., valued at \$5,912,166, or \$2.62 per bbl., compared with 2,586,215 bbl., valued at \$5,328,536, or \$2.06 per bbl., in 1917. This represents a decrease in quantity of 12.9 per cent and an increase in value of 11 per cent.

THE MATERIAL MARKET

THE PRICE FIXING program is a thing of the past. A more complete statement of the controversy which resulted in the ultimate failure of this program and the recent government purchase of 200,000 tons of rails will be found under the report of the activities of the Railroad Administration. The manufacturers, however, are still adhering very closely to the prices agreed upon with Chairman Peek, or which were tentatively established by manufacturers in other lines about to enter negotiations with the price stabilizing board. For this reason, no change is to be noted in the schedule of prices for iron and steel items of interest to the maintenance of way department, which is repeated below:

	Prices in Cents Per Pound	
	Pittsburgh	Chicago
Plates	2.65	2.92
Shapes	2.45	2.72
Bars (steel)	2.35	2.62
Track spikes	3.35	3.62
Track bolts	4.35	4.62
Angle bars	2.75	2.75
Tie Plates, steel	2.75	2.75
Tie plates, iron	2.75	2.75
Wire nails	3.25	....
Barb wire, galvanized	4.10	....

One manufacturer is asking \$2 a ton more for plates than this schedule shows, while in the case of wire products there has been some shading of prices.

It is impossible to say anything about the cost of structural steel to the railroads because practically no structural steel contracts have been placed by them. Such structural steel work as has been awarded recently is understood to be going at very small spreads over the cost of plain material. No orders for track fastenings have been noted. One item, that of the Southern Pacific for 4,000 kegs of track spikes, which has been in the market for some time, has not been placed. The prices of old materials, which are now very low, have been stationary for some time. The following table gives current quotations in prices per gross ton:

	Chicago	St. Louis
Rails, relaying	\$35.00-\$45.00	\$40.00-\$45.00
Rails, rerolling	17.50- 18.00	15.50- 16.00
Frogs and switches cut apart	15.25- 15.75	14.00- 14.50

The price of Portland cement has remained practically stationary as indicated by the following table, which shows increases of 10 cents for Cleveland and Indianapolis and a decrease of 11 cents for Toledo, these prices being in carload lots for cement in sacks, but not including the charge made for the sacks, which is 60 cents for cloth sacks and 25 cents for paper bags (per barrel):

Chicago	\$2.00	Cleveland	\$2.32
Pittsburgh	2.05	Indianapolis	2.27
Milwaukee	2.11	Duluth	2.10
St. Paul	2.30	Toledo	2.12

The manufacturers of lumber still contend that the present prices will prevail or be replaced by still higher ones, a contention which is borne out by the fact that the price of yellow pine has increased about \$2, while that for Douglas fir has advanced from \$2 to \$4 in the same period.

GENERAL NEWS DEPARTMENT

Nearly 19,000 standard cars recently completed for the Railroad Administration have been placed on side tracks for storage unstenciled because they have not been accepted by the railroad companies to whom they were assigned.

The Canadian Pacific has recently arranged to put on a new through passenger train from Montreal to Vancouver which will make the trip in 93 hr. and 30 min., which is an average of 31 miles per hour for the entire distance of 2,886 miles.

A general strike in Canada, which commenced about the middle of May and threatened to affect the operation of the railroads, has gradually spread throughout that country. The nucleus of this trouble and the maximum disruption of business was at Winnipeg.

The Railway Storekeepers' Association has been absorbed by the American Railroad Association and will be known as Section VI. The organization and government under this affiliation will follow closely that of the other sections of the American Railroad Association.

A clearing house for workmen is to be established by the Associated General Contractors of America as an employment bureau for the members of that association. The work will be handled through the office of the secretary at 111 West Washington st., Chicago.

A force of 720 men of the American Transportation Corps in France joined the North Russian Transportation Corps' expeditionary force following a call for volunteers among railway men to operate the line of communication from the Murman coast south to the Bolshevik front.

The sixth national foreign trade convention was held at the Congress Hotel, Chicago, on April 24, 25 and 26, inclusive, being attended by 1,800 delegates from various industries representing all parts of the country. The purpose of this meeting was a thorough discussion of all factors entering into a successful prosecution of American trade abroad.

The state legislature of Colorado has passed a bill providing for the appointment of a commission by the governor to institute proceedings for the condemnation of railroads operating wholly within the state. The prime object of this is to provide for the condemnation of the Denver & Salt Lake to the end that the state may acquire and operate this road to prevent its being dismantled.

The St. Louis & Hannibal Railroad Company has made application for permission to cease operation and junk its entire property, the original cost of which is given as \$1,118,894. It was sold at a trustee sale in 1917 for \$620,000. This is a single track railroad, 86 miles in length, extending from Hannibal, Mo., southeast to Gilmore, where it connects with the Wabash, which makes a connection to St. Louis, 42 miles east.

The five-mile tunnel on the Canadian Pacific near Connaught, B. C., which was being lined by Carter-Halls-Aldinger Company, contractor of Winnipeg, Man., was filled with poisonous gas caused by the explosion of thirty drums of gasoline and kerosene used for the operation of a concrete mixer. A watchman was suffocated in a telephone booth, where he had stopped to escape the gas. A slight fire occurred following the explosion and the extent of damage was approximately \$6,000.

The fiftieth anniversary of the driving of the golden spike which marked the completion of the first American transcontinental railroad was celebrated at Ogden, Utah, on May 10. Veteran railroad men who were connected with the construction of the Union Pacific or the Central Pacific were in Ogden as guests of the city. The building of the "Pacific Railroad" was begun at Omaha, Neb., by the Union Pacific and at Sacramento, Calif., by the Central Pacific in 1863. The race between the two roads to lay the largest mileage of track ended on May 10, 1869, at Promontory, Utah, 50 miles west of Ogden. In the last year of the construction work the two railroads were employing approximately 25,000

men and using 6,000 teams. Many of the men engaged in this work were present at the celebration, and included in these were three Chinese, each over 90 years old, who began railroad work in California about 1849. These three men, Ging Cui, Wong Fok and Lee Cho, were in the gang that laid the last rail of the Central Pacific up to the point where the golden spike was driven. They came from Susanville, Calif., where they were in the service up to three years ago in gang No. 28.

The car surplus on May 1, 1919, on the railroads of the United States, according to a statement issued by the United States Railroad Administration, was 367,666. On the same date there was a shortage of 2,106 cars, leaving a net surplus of 365,560. At the same time a surplus of 19,990 cars was reported on the Canadian roads, with a shortage of 103, leaving a net surplus of 19,887. The surpluses were principally in box and in coal and gondola cars, the figures for the railroads of the United States being 153,739 and 152,387, respectively.

The total expenses of the United States Railroad Administration for the management of the railroads during 1918 were \$3,647,143. During the month of December, 1918, the total payroll was \$280,600 for the central administration and \$252,500 for the regional administration, or at a yearly rate of \$6,390,000. This was for 1,420 officers and employees of the central administration and 1,079 officers and employees of the regional administration. More recent figures show that the railroad administration now has 1,280 officers and employees in Washington who together with 824 officers and employees of the Interstate Commerce Commission make a total of 2,104 persons in the government service at Washington who are engaged in the operation or regulation of the American railways.

Railroad Employees' Subscriptions to Victory Loan.—The director general had received to May 20 the following reports regarding the progress of the Victory Loan among the officers and employees of the United States Railroad Administration:

Region—	Amount Subscribed	Employees on Roll	Employees Subscribing	Percentage
Eastern	\$ 33,584,050	400,219	344,715	86.1
Southern	12,545,000	264,804	128,387	48.48
Poehontas	3,346,700	50,365	34,598	68.69
Allegheny	24,911,500	382,445	294,417	76.99
Southwestern	12,245,700	173,595	119,673	68.9
Northwestern	20,504,950	248,057	204,748	82.54
Central Western	27,951,050	300,580	266,001	88.5
Pullman	1,696,300	21,061	20,759	98.50
Coastwise S. S.	181,150	.....	2,364	.....
Mississippi Warrior Rivers ..	9,600	.....	.....	.....
New York-New Jersey Canals..	14,300	141	138	97.87
R. R. Administration—				
Ship. Bd. Fund	863,000	.....	.....	.....
Washington Office	605,250	1,287	1,287	100
Regional Offices	168,700	.....	.....	.....
Total	\$138,637,250	.....	.....	77

Exports of Steel Rails and Other Track Materials.—The quantity and the value of the rails, railroad spikes, and other iron and steel railway track materials, such as switches, frogs, fishplates, splice bars, etc., products exported during the four months ended with March, the average monthly price thereof in December of each year, and the shipments during the calendar years 1911 to 1918 are given below:

Calendar year	Steel rails			Railroad spikes a		Other railway track material (value)a
	Tons	Value	Price per ton in December	Pounds	Value	
1911.....	420,874	\$12,229,045	\$29.11	.....	.....	.....
1912.....	446,473	13,053,774	29.62	.....	.....	.....
1913.....	460,553	13,979,549	31.23	25,375,827	\$483,283	\$3,088,866
1914.....	174,680	5,103,918	27.05	15,489,687	258,808	1,775,391
1915.....	391,379	12,095,170	32.65	29,693,252	591,752	4,857,047
1916.....	540,828	20,417,582	38.43	53,428,813	1,489,091	6,540,187
1917.....	512,669	24,013,090	52.65	47,467,317	2,009,808	8,194,270
1918.....	453,944	26,440,780	60.80	22,330,104	1,229,083	5,546,960
Dec., 1918..	44,982	2,735,544	60.80	1,708,554	116,787	541,522
Jan., 1919..	65,024	4,221,563	64.90	3,509,054	189,408	543,330
Feb., 1919..	66,900	4,611,982	68.94	4,206,228	258,073	905,264
March, 1919.	48,955	3,051,611	62.30	4,185,816	193,987	515,535

a Not separately stated prior to July 30, 1912.

PERSONAL MENTION

GENERAL

J. D. Haydon, roadmaster on the Louisville & Nashville, with headquarters at Louisville, Ky., has been promoted to superintendent of the Atlanta division with headquarters at Etowah, Tenn., succeeding **A. B. Bayless**, resigned.

Lewis Randolph Taylor, who has been appointed superintendent of the Virginian Railway, with headquarters at Princeton, W. Va., was employed for a number of years in railway engineering and maintenance work. He was born on September 22, 1871, at Charlottesville, Va. He began railway work on September 1, 1888, with the Richmond & Danville, now a part of the Southern Railroad, as a rodman, and was employed on surveys and construction work on that road, the Chesapeake & Ohio, the Chicago & Eastern Illinois, and the Ohio Southern for the next five years. From May, 1895, to May, 1897, he served in the maintenance of way department of the Baltimore & Ohio, Philadelphia and Baltimore divisions, and then to September, 1901, was assistant engineer, United States Engineering department, in charge of field work, coast defense and harbor improvement in the Baltimore harbor. From September, 1901, to June, 1903, he was in the general contracting business in Baltimore, and then was engaged in making the reconnaissance surveys for the Deepwater and Tidewater railways, which later became the Virginian Railway, until February, 1904. He then served consecutively as division engineer, principal assistant engineer and superintendent of construction on the Tidewater railway, and from April, 1909, to March, 1918, as superintendent of the Third and Deepwater divisions of the Virginian Railway. From March, 1918, until his recent appointment he was engaged in mining enterprises.

N. L. Howard, until recently colonel of the Thirteenth Engineers (Railway) regiment, and at one time a track foreman and roadmaster on the Chicago, Burlington & Quincy, has been made assistant to the federal manager of that road, with headquarters at Chicago. Colonel Howard was born at Fairfield, Iowa, and was appointed a cadet at the United States Military Academy at West Point, N. Y., from which he graduated in 1907. Shortly after he entered the employ of the Chicago, Burlington & Quincy as a civil engineer. Later he served as an extra gang foreman for a year and a half, after which he was roadmaster at Aurora, Ill., for a year. He was then transferred to the operating department as trainmaster at Centerville, Iowa, and was later made assistant superintendent at Galesburg, Ill., from which position he was promoted to superintendent of the Burlington division at Burlington, Iowa. In June, 1917, he was recommended for a commission as lieutenant-colonel in the Chicago Railway Regiment, Third Reserve Engineers, and in July of the same year entered the military services as a lieutenant-colonel in that regiment stationed at Chicago, later known as the Thirteenth Engineers, with which he was sent abroad in July of the same year, landing in France in August. Upon his arrival in France he was detached from the Thirteenth Engineers and assigned to duty with the director-general of transportation until the spring of 1918, when he



Col. N. L. Howard

was returned to the command of the Thirteenth, then located in the Verdun sector. On July 8, 1918, Lieutenant-Colonel Howard was promoted to colonel. While in command of the Thirteenth Engineers he saw service in the Champagne, St. Mihiel and Meuse-Argonne sectors and on February 22, 1919, he was awarded a Croix-de-Guerre from the French High Command. On February 28, 1919, he was relieved of his command and returned to this country in March.

ENGINEERING

H. A. Dixon has been appointed chief engineer of the Canadian National Railways, Western Lines, with headquarters at Montreal, Que., succeeding **A. T. Fraser**, deceased.

F. R. Ramsey, engineer maintenance of way of the Toledo, St. Louis & Western, with headquarters at Frankfort, Ind., has been promoted to chief engineer, with the same headquarters.

B. H. Prater has been appointed engineer maintenance of way of the Oregon Short Line, with headquarters at Pocatello, Ida., to succeed **R. B. Robinson**, whose promotion to engineer maintenance of way of the Union Pacific is mentioned on another page of this issue.

A. M. Traugott, division engineer on the Virginian, with headquarters at Princeton, W. Va., has been appointed acting chief engineer, with office at Norfolk, Va., succeeding **F. L. Nicholson**, who is resuming full service with the Norfolk Southern.

I. O. Walker, division engineer of the Atlanta division of the Nashville, Chattanooga & St. Louis, with office at Atlanta, Ga., has retired after 33 years continuous service, 28 of which were spent with the Nashville, Chattanooga & St. Louis and leased lines.

R. L. Schmid has been appointed assistant division engineer of the Nashville, Chattanooga & St. Louis, with office at Nashville, Tenn., succeeding **J. L. Fergus**, who has been appointed assistant engineer. The headquarters of **D. E. Counts**, supervisor of bridges and buildings, have been moved from Atlanta to Chattanooga.

Colonel George H. Webb, who was recently discharged from military service, has been reappointed chief engineer on the Michigan Central, with headquarters at Detroit, Mich., while **J. F. Deimling**, who has been serving as chief engineer in Mr. Webb's absence, has been reappointed assistant chief engineer. **George H. Harris**, who has been acting as assistant chief engineer, has been appointed special engineer on that road with the same headquarters.

Major T. W. Fatherson, who has just returned from service overseas in the 13th Railway Engineers, has been reinstated in his position as engineer maintenance of way of the Southern division of the Chicago Great Western, with headquarters at Des Moines, Ia., which position he held prior to his entrance into military service. **E. M. Lewis**, engineer maintenance of way at Des Moines during Mr. Fatherson's absence, has been transferred to the Western division with headquarters at Clarion, Ia.

J. R. Holman, formerly (to September, 1915) chief engineer of the Oregon-Washington Railroad & Navigation Company, now colonel in command of the Eighteenth (railway) Engineers, at Bordeaux, France, has been awarded a Distinguished Service Medal. The order of General Pershing, dated March 27, commends Colonel Holman in connection with his supervision of construction in the vicinity of Bordeaux, for the display of "unusual judgment and great executive ability;" and in addition, "he rendered valuable services and advice to the other departments of Base Section No. 2."

R. B. Robinson, engineer maintenance of way of the Oregon Short Line, with headquarters at Pocatello, Ida., has been promoted to engineer maintenance of way of the Union Pacific, with headquarters at Omaha, Neb., to succeed **W. R. Armstrong**, promoted to chief engineer of the Oregon Short Line. Mr. Robinson entered railway service with the Union Pacific, with which road he served in various minor engineering positions for six years. For the past 15 years he has been in the employ of the Oregon Short Line in various

engineering positions until appointed to the office of engineer maintenance of way, in which capacity he served until his recent promotion.

W. R. Armstrong, engineer maintenance of way of the Union Pacific and the St. Joseph & Grand Island, with headquarters at Omaha, Neb., has been promoted to assistant chief engineer of the Oregon Short Line and the Los Angeles & Salt Lake, with headquarters at Salt Lake City, Utah., succeeding Carl Stradley, deceased. Mr. Armstrong has had 25 years of railroad experience, both as an engineer in charge of construction and maintenance of way and as an operating officer. Before entering the employ of the Oregon Short Line in 1905 he was connected with several lines in the Middle West. During his first year with the Oregon Short Line he was employed on special engineering work and in the following year was placed in charge of the construction of the Yellowstone Park branch and the extension from Huntington, Ore., through the Snake River canyon, to Homestead. In 1908 Mr. Armstrong was made superintendent of the Montana division, which position he held until 1913, when he was promoted to general manager and chief engineer of the Salt Lake & Utah, then under construction. On August 1, 1916, he was appointed engineer maintenance of way of the Union Pacific, which position he held until his recent promotion.



W. R. Armstrong

Joshua D'Esposito, assistant chief engineer of the Chicago Union Station Company, Chicago, has been promoted to chief engineer, succeeding **Thos. Rodd**, who has been made consulting engineer. He was born at Sorrento, Italy, on July 30, 1878, and received his education in naval architecture and marine engineering in the Nautical State School of Italy, from which institution he graduated in 1897. Upon his arrival in this country he entered the railway service of the Pittsburgh Railway Company as a designing engineer, which position he held until the spring of 1904. He entered the services of the Pennsylvania Lines in March, 1905, as a designing engineer, in which capacity he served for two years, being made chief draftsman in 1907. In 1911 he began working on Chicago problems, being transferred to that city in 1913 at the time of the commencement of negotiations with the city of Chicago which led up to the passage of the ordinances for the Chicago Union Station. The following year he was promoted to assistant chief engineer of the Chicago Union Station Company, which position he held until November, 1917, when he was called into the services of the government as assistant manager of the wood ship division of the Emergency Fleet Corporation in charge of the installation of machinery in wooden ships, with headquarters at Philadelphia, Pa. On January 1, 1919, he severed his connections with the Emergency Fleet Corporation and again took



Joshua D'Esposito

up his duties as assistant chief engineer of the Chicago Union Station Company until his recent promotion as chief engineer on May 1.

J. K. Yorston, resident engineer of the Lethbridge division of the Canadian Pacific, has been appointed locating engineer on that road, with headquarters at Winnipeg, Man. Mr. Yorston entered railway service with the Canadian Pacific in August, 1906, as a rodman on construction work. In January, 1907, he became head chainman on location and four months later topographer. In May, 1908, he again held the position of rodman on construction and subsequently instrument man, head chainman on location and instrument man on construction, and in December, 1909, was promoted to resident engineer on construction. In January, 1913, he became transitman on location and in April, 1913, again held the position of resident engineer on construction, grading, track laying and ballasting. From September, 1915, to December, 1916, he was concrete inspector and instrumentman on the Connaught tunnel. In April, 1917, he was promoted to resident engineer of the Lethbridge division, which position he held until his recent promotion to the position of locating engineer.



J. K. Yorston

Joseph B. Oatman, roadmaster on the Buffalo, Rochester & Pittsburgh, with headquarters at DuBois, Pa., has been promoted to acting division engineer with the same headquarters. Mr. Oatman was born at Golden, N. Y., in February, 1875, and was educated in the public schools of that place. He entered the employ of the Buffalo, Rochester & Pittsburgh as a section laborer in August, 1897, and has been in the continuous employ of that road. He was promoted to the position of section foreman at West Falls, N. Y., on March 17, 1899. From July, 1907, to June, 1909, he was extra gang foreman, from which position he was promoted to roadmaster of the third division with headquarters at Du Bois, Pa. His promotion from roadmaster to acting division engineer became effective April 9.



Joseph B. Oatman

A. A. Woods, superintendent of the New Orleans & Northeastern railroad and the New Orleans Terminal Company, with headquarters at New Orleans, La., who was appointed chief engineer maintenance of way and structures on the Southern Railway System, Lines West, with headquarters at Cincinnati, Ohio, as noted in the *Railway Maintenance Engineer* for May, was born at New Orleans, La., and graduated from the Tulane University, Louisiana, in 1895. He entered railway service in July, 1895, with the New Orleans & Western (New Orleans Terminal Company) as a rodman on location work and in October of that year entered a post graduate course at the Tulane University. From July, 1896, to July, 1897, he was employed as a draftsman in the maintenance of way department of the New Orleans & North-

eastern, with headquarters at New Orleans, La., and was later employed as a draftsman in the mechanical department of that road with headquarters at Meridian, Miss. In January, 1898, he was made assistant engineer on the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with office at Vicksburg, Miss., and from September, 1899, to November, 1901, he was assistant engineer of the New Orleans & Northeastern with office at New Orleans, La. In November, 1901, he left that road to again enter the service of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific as engineer maintenance of way. From July, 1913, to February, 1915, he was engineer maintenance of way of the New Orleans & Northeastern and in February, 1915, he was promoted to superintendent of that road with headquarters at New Orleans, La. In January, 1917, he became superintendent also of the New Orleans Terminal Company, which position he held until appointed chief engineer of the Southern Railway, Western Lines, in April, 1919.

TRACK

W. S. Fife, assistant engineer on the Pennsylvania Lines West, with headquarters at Logansport, Ind., has been appointed roadmaster of the Indianapolis and Michigan City division of the Lake Erie & Western with headquarters at Peru, Ind., succeeding **J. DeMeyer**, resigned, effective May 20.

W. D. Fitzgerald has been appointed roadmaster of the Fourth District of the Salt Lake division of the Denver & Rio Grande, with headquarters at Manti, Utah, succeeding **M. J. Nelligan**, transferred to the First District of the Salt Lake division, with headquarters at Salt Lake City. Mr. Nelligan succeeds **D. Rushford**, resigned.

Charles Hayes, section foreman on the Minneapolis, St. Paul & Sault Ste Marie at Rhinelander, Wis., was appointed acting roadmaster on the Duluth-Superior division of that road, with headquarters at Moose Lake, Minn., to fill the vacancy caused by the transfer of **William McGregor**, roadmaster of that division, to the first district of the Minnesota division, with headquarters at Minneapolis, Minn. Mr. McGregor succeeds **John B. Kelly Jr.**, promoted, as noted elsewhere in these columns.

Joseph W. Starkey, general foreman on the Los Angeles division of the Southern Pacific, with headquarters at Los Angeles, Calif., has been promoted to roadmaster on the Tucson division of that road with headquarters at Tucson, Ariz., succeeding **E. F. Mead**, assigned to other duties. Mr. Starkey was born at Mendocino, Cal., on December 6, 1883, and entered railway service with the Southern Pacific as a laborer on the Shasta division in June, 1898. In 1900 he became section foreman and later extra gang foreman on this division, and on June 1, 1908, he was transferred to the Sacramento division as section and extra gang foreman. In May, 1913, he was transferred to the Los Angeles division, serving in the same capacity until February 1, 1918, when he was promoted to general foreman on that division, which position he held until his recent promotion.

John B. Kelly Jr., roadmaster on the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., has been promoted to assistant general roadmaster of that road with the same headquarters. Mr. Kelly was born at Milbank, S. D., on December 30, 1882. After spending two years at the State University of Arkansas he entered railway service in September, 1899, with the St. Louis Southwestern as a maintenance clerk. From 1899 to 1900 he was employed by the Kansas City Southern as a timekeeper. Later he entered the service of the Minneapolis & St. Louis as section foreman and extra gang foreman. In 1902 he went with the Iowa Central, serving that road in the capacity of roadmaster for seven years. In 1909 he entered the service of the Minneapolis, St. Paul & Sault Ste. Marie in the same capacity and has remained with that road to the present time.

F. D. Dutton, general foreman and acting roadmaster on the Southern Pacific, with headquarters at Bowie, Ariz., has been promoted to roadmaster, succeeding **J. A. Ford**, assigned to other duties. Mr. Dutton was born at Georgetown, N. Y., on March 2, 1873. He entered railway service on May 1, 1889, with the New York Central as a yard clerk and switchman and in 1893 he took the position of bill clerk in

the accounting department at New York City. From 1896 to 1900 he served as roadmaster's clerk, extra gang and general foreman of the seventh subdivision and then entered the service of the Union Pacific as a brakeman and switchman on the Wyoming division. From 1905 to 1908 he was employed by the Southern Pacific as a clerk in the division engineer's office at San Francisco and foreman and general foreman of the Coast division, later being promoted to roadmaster of the Benson district with headquarters at Benson, Ariz. In 1909 he was employed consecutively by the San Diego & Arizona as material agent, freight agent, customs broker, superintendent of construction and assistant superintendent, and in 1915 he again entered the service of the Southern Pacific in the capacity of general foreman, later being promoted to acting roadmaster at Bowie, Ariz., and now becoming roadmaster with the same headquarters.

Jeremiah O'Connor, special roadmaster on the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., has been promoted to general roadmaster on that road, the Duluth, South Shore & Atlantic and the Mineral Range with the same headquarters. Mr. O'Connor was born in Ireland on August 17, 1862, and entered railway service in May, 1879, with the Utica, Ithaca & Elmira as a track laborer and timekeeper, being promoted to assistant extra gang foreman in 1881. In 1882 he entered the service of the Baltimore & Ohio in the same capacity, and two years later was employed by the Chicago, Milwaukee & St. Paul as section foreman. In 1885 he was employed by the Minnesota & Northwestern as extra gang foreman, and in 1887 he went to the Minneapolis, St. Paul & Sault Ste. Marie in the same capacity. From 1891 to 1892 he was with the Northern Pacific in a like position, and from that road he went to the Great Northern, also serving as extra gang foreman on that road. In 1894 he again entered the employ of the Soo Line with the title of roadmaster, being promoted to special roadmaster in 1909, which position he has held until his recent promotion to general roadmaster of the roads under the supervision of G. R. Huntington, federal manager.

E. G. Buchanan has been appointed acting roadmaster on the Southern Kansas division of the Atchison, Topeka & Santa Fe with jurisdiction over the First district from Independence, Kan., to Tulsa, Okla., and the Cedarville district, with headquarters at Independence, succeeding **G. W. Smith**, who is to have jurisdiction over the First district from Chanute, Kan., to Independence, including Independence yard, the Third district from Independence to Moline, Kan., and the Fredonia and Coffeyville districts, with the same headquarters, vice **C. Miller**, assigned to other duties. **A. L. Oliphant**, roadmaster on this division, has had his territory changed to cover the Girard district and the Second district from Madison Junction to Chanute, including also the Chanute yard.

Charles M. Francis has been appointed roadmaster on the Rapid City, Black Hills & Western, with headquarters at Rapid City, S. D., succeeding **J. E. Skaggs**. Mr. Francis was born at Lewisburgh, W. Va., on October 4, 1868, and entered railway service with the Chicago, Milwaukee & St. Paul on September 2, 1891, as a section laborer on the Kansas City division. In November, 1893, he was promoted to foreman, and one year later he left that company and went to the Chicago, Burlington & Quincy as a section foreman on the Alliance division, in which capacity he served for 11 years. On May 1, 1906, he resigned and entered the employ of the Rapid City, Black Hills & Western as a foreman and one year after he again joined the forces of the Chicago, Milwaukee & St. Paul as a foreman of construction work on the Black Hills division. In April, 1909, he returned to the Chicago, Burlington & Quincy as extra gang foreman, in which capacity he served for the next three years. In 1912 he became foreman in the yard at Lead, S. D., remaining there until his appointment as roadmaster on the Rapid City, Black Hills & Western.

BRIDGE

Leo J. Lenz, carpenter foreman on the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been made chief carpenter on the Chicago & Council Bluffs division in Illinois with the same headquarters, succeeding **A. D. Beesley**, who has resigned.

PURCHASING

C. Z. Hughes has been appointed purchasing agent of the Ann Arbor railroad, with office at Toledo, Ohio.

Dwight C. Curtis, inspector of stores on the Chicago, Burlington & Quincy, with headquarters at Chicago, has been promoted to supervisor of stores of the Northwestern region, with the same headquarters, succeeding **J. E. Mahaney**, resigned to accept service elsewhere.

R. L. Irwin, purchasing agent of the Gulf, Colorado & Santa Fe and associated lines, with headquarters at Dallas, Texas, has had his authority extended over the Beaumont, Sour Lake & Western, the Houston Belt & Terminal, the Iberia, St. Mary's & Eastern, the New Iberia & Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern, and the St. Louis, Brownsville & Mexico.

W. H. Clifton, lumber agent on the Baltimore & Ohio, Eastern Lines, has been appointed assistant purchasing agent on the Baltimore & Ohio, Eastern Lines, the Coal & Coke, the Morgantown & Kingwood, the Western Maryland, the Cumberland Valley, and the Cumberland & Pennsylvania; **D. A. Williams**, general storekeeper of the Baltimore & Ohio, Eastern and Western Lines, and the Western Maryland, has been appointed assistant purchasing agent on all the above-named roads, and **H. P. McQuilkin**, assistant general storekeeper on the Baltimore & Ohio, Eastern Lines, has been appointed general storekeeper on all the above-named roads; all with headquarters at Baltimore, Md.

OBITUARY

Charles H. Jacobi, assistant engineer with the Division of Capital Expenditures, United States Railroad Administration, died of pneumonia in Salt Lake City, Utah, on April 20, while on an inspection trip en route to the Pacific coast. Mr. Jacobi was born in Brooklyn, N. Y., on March 14, 1883, and was employed for a number of years as assistant engineer with the Lehigh Valley, and more recently as construction engineer with the Westinghouse, Church, Kerr Company, New York. He entered the service of the Railroad Administration on July 22, 1918.

W. M. Noon, who for 29 years was superintendent of bridges and buildings of the Duluth, South Shore & Atlantic, died at Miami, Fla., on April 27. Mr. Noon began railroad work 52 years ago on the Chicago, Milwaukee & St. Paul as a subcontractor for wood cutting. He was employed with contractors in various capacities for the following few years, later going into railroad construction business for himself, specializing on bridge building. One of his important projects for the Chicago, Milwaukee & St. Paul was the construction of a drawbridge across the Kinnikinnick river near Milwaukee. Mr. Noon continued working for this company for 10 years, going to the Chicago & North Western in 1884. He remained with that company for two years, when he went to the Elkhorn & Missouri Valley. In 1889 he entered the employ of the Duluth, South Shore & Atlantic, for which company he performed much commendable work, including the rebuilding of a burned trestle bridge 518 ft. long and 28 ft. high in 32 hours with a crew of 28 to 32 men. Mr. Noon resigned as superintendent of bridges and buildings with the Duluth, South Shore & Atlantic in August, 1912, and moved to Florida. He was for many years a member of the American Railway Bridge & Building Association, taking active part in their proceedings.

Michigan Railroad Commission Abolished.—The Lemire-Brower bill abolishing the railroad commission and creating in its stead a public utilities commission has been signed by Governor A. E. Sleeper of Michigan. The railroad commission automatically went out of existence with the signing of this bill. The members of the railroad commission were C. L. Glasgow of Nashville, A. A. Keiser of Ludington and Charles S. Cunningham of Detroit. Four of the five members of the new commission have been appointed, as follows: William M. Smith of St. Johns, chairman of the Industrial Accident Board; Samuel Odell of Shelby, state treasurer; William Potter of Hastings and Sherman Handy of Sault Ste. Marie.

CONSTRUCTION NEWS

The Black Mountain Railroad has completed the line building from Hulen, Ky., to the head of Packetts creek, a distance of 8 miles. The track laying was carried out by company forces. **M. E. S. Posey** of Path Fork, Ky., is chief engineer.

The Canadian Pacific has asked the Dominion government for permission to build various branch lines in the western provinces of Canada as follows: From Duchess, on the Basano easterly branch in Alberta, in a general northerly direction; from Archive, on the Moose Jaw southwesterly branch, in a southwesterly and westerly direction to Wymark, on the Swift Current southeasterly branch in Saskatchewan; from a point on the Moose Jaw northwesterly branch at or near either Fortune or Rosetown, Saskatchewan, in a general southerly direction for 50 miles, then easterly for 30 miles in Saskatchewan; from a point on the Weyburn-Stirling branch in Saskatchewan in a southerly direction across two townships and thence in a westerly direction; from Lanigan, on the Pheasant Hills branch, in a northeasterly direction to a point between Carroll and Saskatchewan river and then to a point near Cumberland House, Saskatchewan; from Leader, on the Swift Current northwesterly branch, in a southwesterly direction 50 miles, and then easterly to a point on Big Stick lake in Saskatchewan; from a point on the Manitou Lake branch to a point on the Whitford Lake branch in Alberta.

The Chicago & North Western has authorized the construction of a new passenger station at Clinton, Ia. The new structure will be of brick, one story high, 28x287 ft., with a tile roof and a concrete substructure. A small power house, 47x57 ft., one story high, of brick construction will be built in conjunction with the new station, and the total cost with necessary improvements will be approximately \$250,000. The contracts for the work have not been let.

This company is also completing an addition to its division shops at Kaukauna, Wis., to be used exclusively for the production and compression of acetylene gas for welding and cutting tools at its various shops in central and northern Wisconsin, heretofore supplied from Chicago. These new plants and equipment represent an investment of about \$5,000.

The Chicago Union Station work now in progress includes work on the foundations of the headhouse which at present are about 60 per cent completed, work on the substructure of the Harrison street viaduct 40 per cent completed and on the Taylor street viaduct 50 per cent completed. Steel for the Polk street viaduct has been completed and will be on the ground within 30 days. Rails and ties for tracks from Van Buren street to Twelfth street have been bought and it is planned to contract for the grading and track work in a short time. Steel for the reconstruction of the Harrison street viaduct has been delivered and work will soon be started.

The De Queen & Eastern Railway is connecting a terminus of its road at the Arkansas-Oklahoma state line, about nine miles west of De Queen, Ark., with a line extended from the terminus of the Texas, Oklahoma & Eastern at Broken Bow, Okla. Beginning at a point on the St. Louis-San Francisco at Valliant, Okla., and extending east through Bismark and Broken Bow in Oklahoma and De Queen, Lockesburg and Dierks in Arkansas, a link of 76 miles will be built. Work remaining to be done includes six miles of grading and 15 miles of track laying. The structures include one 100-ft. steel span and many trestles, which will be built by company forces.

The Erie Railroad, the Baltimore & Ohio and the Pennsylvania Lines West have entered into an agreement with the city of Akron, Ohio, for the elimination of certain grade crossings in that city. The first step provided for in the agreement is the construction of a temporary structure over

the East Miller avenue crossing to cost about \$135,000. The whole of this work will cost about \$4,000,000, to be divided on the basis of 65 per cent to the railroads and 35 per cent to the city.

The Great Northern will rebuild the bridge over the Whitefish river west of Whitefish, Mont., replacing the 341-ft. timber trestle and 150-ft. Howe truss span with steel. The material for this work is now on the ground. This road has also let a contract for the filling of the Beaver Bay trestle and the work will be completed this season.

The Illinois Central has received bids for the construction of a new passenger station, freight house and heating plant at Centralia, Ill. The passenger station will be 325 ft. by 36 ft., of which 85 ft. by 36 ft. will be two stories. The construction will be of reinforced concrete and brick with slate roofing. The freight house will be of concrete and brick construction with maple floors and a slate roof. The building will be 218 ft. by 40 ft., of which 110 by 40 ft. will be two stories. The heating plant will be 30 ft. by 34 ft., of brick and stone reinforced concrete construction with slab and composition roof. In conjunction with the new buildings considerable amount of new trackage, paving, sewerage, water lines and platforms will be constructed. The approximate cost of the entire construction will be \$250,000.

This road has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for the construction of a concrete dam across the Tradewater river at Dawson Springs, Ky., to supply water for a pumping station. The dam will be of concrete construction, 14 ft. high by 125 ft. long and 10 ft. thick, and will cost approximately \$6,000. Work has already been started on the project. This road has also awarded a contract to the same company for the construction of a pumping station 27 ft. by 27 ft. in area, one story in height, of brick with concrete foundation and slate roof. The machinery will consist of two 25 h.p. fuel-oil engines having belt connections with two 500 r.p.m. centrifugal pumps, discharging through 3,000 ft. of 10 in. cast iron main pipe into a 100,000 gallon tank. The approximate cost will be \$35,000.

The Live Oak, Perry & Gulf has given a contract recently to J. D. Donnahoo, Jacksonville, Fla., to build four miles of the Economa River extension west and to build a bridge across the Aucilla river. The company has work completed on about five miles of the total extension, which is to be about ten miles long.

The Sioux City Stock Yards Company will build two new terminal yards, costing approximately \$150,000, at Sioux City, Ia., this spring to facilitate the delivery of live stock. The terminals will have a combined capacity of 600 cars.

The Southern Railway has given a contract to M. M. Elkins, Macon, Ga., for building a bridge at Gaffney, S. C. The bridge and retaining wall approach will be of reinforced concrete construction. The structure will consist of three spans, one of which will be 35 ft. long and the other two 26 ft. long. The cost of the work will be about \$30,000.

This road is building, with its own forces, transfer sheds at the Atlanta (Ga.) transfer yard. The structures are to be one story high; one of the buildings will be 16 ft. wide and 760 ft. long, and another will be 30 ft. wide and 760 ft. long.

This road is also carrying out improvements to the bridge near Spencer, N. C., over the Yadkin river, at mile post 330.8, to consist of four single track deck riveted steel spans about 160 ft. long designed for Cooper's E-60 loading. Repairs will be made to portions of the existing masonry. The estimated cost for the entire work is about \$170,000. The American Bridge Company has the contract for fabricating and erecting the superstructure.

Electrification in Sweden.—The Swedish State Railway Administration has published a statement to the effect that after investigations regarding the electrification of the entire Swedish railway system, it has come to the conclusion that the plan can be carried out in 30 years at a cost of 192,000,000 kr. The advantages of electrification are that the whole of the power needed can be obtained from eight Swedish electric power stations, the traffic capacity will be considerably increased, and a great saving in staff costs will be effected.

FOREIGN RAILWAY NEWS

The Birmingham Corporation Tramways' Committee of Birmingham, England, has awarded a contract of 1,200 tons of rails to an American manufacturer, the reason being that the American manufacturer offered more favorable price and delivery than any English manufacturer was willing to concede.

Lubricating oil is desired by the Bulgarian state railroads. The quantities are as follows (1 kilo equals 2.2 pounds): Engine oil, 1,300,000 kilos; cylinder oil, 500,000 kilos; superheated cylinder oil, 200,000 kilos; axle oil, 600,000 kilos; gas oil 200,000 kilos; colza, 50,000 kilos; linseed oil, 30,000 kilos; kerosene 40,000 cases, and benzine, 1,200 cases.

The senate of Uruguay has passed a bill authorizing the purchase by the state of the Uruguay East Coast Railway and the construction of a branch line from La Paloma to Rocha. The government was urged to proceed with the construction of the latter without delay, although it was estimated that it would cost \$40,000 per kilometer at present.

The Toakow Chinghua line in China is about to begin work upon a branch of 37 miles from Chinghuachen to Menghsien. The latter point is on the Yellow river, which offers a means of distributing a considerable portion of the coal business arising some ten miles east of Chinghuachen. Owing to the poor navigability of the river during a large portion of the year, it is not anticipated that any large tonnage will be diverted from the usual rail haul to the Peking-Hankow line. The funds are being supplied by the Peking Syndicate, owner of the mines in question.

The Peking-Suiyuan line is about to begin work upon a short branch to an iron mine a little north of Kalgan. The principal stockholders in the mine are the managing director of the Peking-Suiyuan Railway, the minister of communications, the former minister to Japan, now head of the Japanese Exchange Bank of China, and other high officials in the present government. It is understood that ore will be shipped to the Hangyang Iron Works at Hangyang, about 1,000 miles to the south. The latter is under contract to sell its entire output to Japanese merchants.

The Peruvian Congress has authorized the executive power to build a branch railway from kilometer 76 on the Chimbote to Recuay line to Cajabamba. A committee of civil engineers has been appointed to recommend to the Peruvian government the most feasible and desirable of the different surveys made for the construction of the Jatunhuasi Railway. The Lima to Lurin Railway, the construction of which was commenced under the administration of President Billinghurst, was completed and opened to traffic during the latter part of 1918. The road is 46 kilometers long.

New railway laws in Venezuela have recently come into force which materially affect future construction in that country. Hereafter, the government will no longer guarantee the interest on capital invested in the construction of railways, and all contractors are to be required to make a cash deposit proportionate to the length of the line and the width of the gage in accordance with the following scale: 2-ft. gage, 600 bolivares per kilometre; 3-ft. gage, 900 bolivares per kilometre; 3-ft. 6-in. gage, 1,000 bolivares per kilometre; 4-ft. 8½-in. gage, 1,400 bolivares per kilometre. (One bolivar equals 19.3 cents.) These deposits may be reduced by presidential decree by as much as 15 per cent.

The Chilean government has decided to place a loan of \$32,000,000 with a view to expending the money for railway improvements within the next six years and it is anticipated that further loans will be made later. Much of this money will be spent in the purchase of equipment, the following being a rough outline of the different items contemplated: Electric lines, feeders and sub-stations, \$2,300,000; electric locomotives, \$2,100,000, which materials will be used in the electrification of the railway between Valparaiso and Santiago; rolling stock, \$5,200,000; railroad shops, \$3,100,000;

couplers and air brakes, \$1,640,000; electric signal system, \$1,500,000; reconstruction and reinforcing of bridges, \$1,200,000; sidings and double tracking, \$2,820,000; coal storages, \$800,000; ballast cars, \$364,000; buildings, warehouses, machine shops and platforms, \$3,600,000.

The construction of a railway in Ecuador from the capital (Quito) to Esmeraldas has long been under consideration and the government has now determined to proceed with the building of the line. The section to Ibarra will have a length of 167 km. and a 3.5 per cent ruling grade. The construction work is estimated to cost between 8,000,000 and 8,500,000 sucres (about \$4,000,000), although the expenditures are expected to overrun the estimate. The Ibarra Railroad will be built in two sections, upon one of which work was commenced in August, 1917, but less than one-third of which has been graded up to the present time.

The Department of Bolivar, Colombia, has under consideration the building of a new railroad to connect Cartagena with the line now being constructed north from Medellin in the Department of Antioquia. A light, narrow-gage road is to be built, the preference being for an electric line, using Diesel electric locomotives of light weight. The chamber of commerce has secured \$20,000 to defray expenses of the preliminary location and survey of the new line, and there is every evidence that the department will push the work as fast as possible. Although no definite specifications of requirements are available, they are being prepared now.

The iron and steel plants of the Monterey Iron & Steel Company, Monterey, Mexico, are now giving employment to about 1,200 men, and the number will be increased to about 2,500 when full operation is resumed. The orders for steel rails are not confined to the National Railways of Mexico, but embrace a number from mining companies and private industrial interests, it is stated. The demand for structural steel is constantly increasing. This comes from the larger cities of the country. The company is now obtaining its iron ore supply from its own ore beds, situated only about 60 miles from Monterey. Formerly its ore supply came chiefly from Iron Mountain, situated at Durango. The Monterey Iron & Steel Company is composed of Italians and the plant represents an initial investment of \$10,000,000 in gold.

Trinidad is a market for railway and telegraph supplies, according to Consul Henry D. Baker of the Trinidad, British West Indies. Owing to the high prices of materials and the difficulties in arranging prompt delivery of goods, the roads have been running with decreasing efficiency during the war. Equipment, consisting of four large and three small locomotives, ironwork for 100 freight cars, and about \$80,000 worth of bridge material, recently ordered by the government railway from England is the first to be purchased in five years. An order consisting of 500 tons of 60-lb. rails, English standard, 33 ft. in length, for relaying track has also been placed in the United States.

There is a public demand for an extension of the government railway to the east and north coasts of the islands. One branch line, which extends from Port of Spain to Sangre Grande, lacks about eight miles of reaching the east coast, and another branch, to Rio Claro, comes within 15 miles of the important cocoanut regions at Mayaro, also on the east coast. There the road will probably be extended, while another extension is planned to go to Salybia and Toco Bays, on the northeastern coast.

In addition to the Trinidad government railway the leading sugar estates of Trinidad also maintain private lines for the conveyance of sugar cane to their factories. The Usine Ste. Madeleine Sugar Company has about 40 miles of railway through its sugar cane farms; Waterloo Estate, 20 miles; Caroni Estate, about 15 miles, and the La Fortune and Hermitage Estates, about 18 miles. Each one requires a certain amount of new rails every year for replacements and extensions, the average being about one-half mile each. The rails used are chiefly those rejected by American railway companies as defective, but as the sugar estates use their lines only for about three months a year, and very little traffic is carried over them, the defects do not matter. The rails weigh as much as 55 lb. a yard and the tracks are standard gage, 4 ft. 8½ in.

SUPPLY TRADE NEWS

SALE OF SURPLUS PROPERTY BY THE GOVERNMENT

The general policies of the War Department in the disposal of surplus property were enunciated by C. W. Hare, director of sales, to a committee representing the trade and technical papers of the country at a recent meeting in Washington.

Mr. Hare stated that the War Department would dispose of its surplus materials by first consulting with the various branches of the government to ascertain what, if any, of these materials could be utilized in regular government work. After the government requirements have been satisfied, the producers of each particular commodity will be called into conference to advise with the director of sales as to the best method of getting the remaining amount of the commodity back into the usual channels of trade.

If, as has been the case in the disposal of copper, sulphur, lead, wool and lumber surplus stocks, the industry is able to contract with the government to dispose of its surplus within a reasonable length of time, paying the government the current market prices, it would be the policy of the government to make such an arrangement.

Should both of the methods mentioned fail, the surplus property will be offered to the general public through auction sales, or by sealed bids, or in any other manner which will enable the government to obtain the best prices.

A Sales Promotion Section has been established under the supervision of T. R. Elcock Jr. to collect all information pertaining to the disposition of surplus property and to see that appropriate information reaches interested industries through the proper trade and technical papers.

GENERAL

Briggs & Turvias, Inc., iron and steel, Chicago, has opened a New York office at 1805 Equitable Trust building to be under the direction of the president of the company, Carl R. Briggs.

The Massey Concrete Products Corporation, Chicago, will open an office in the Oliver building, Pittsburgh, on June 1, in charge of A. F. Humphrey, resident manager. J. A. Higgs, Jr., has been appointed resident manager for this company in the southeastern district with headquarters at the Chandler Annex, Atlanta, Ga.

The Bailey Meter Company removed its main office and works from Boston, Mass., to Cleveland, Ohio, on May 1. The Boston office, with H. D. Fisher as manager, is retained to handle sales and engineering service work in the New England district. For the present the New York and Philadelphia districts will be covered from Boston and all other districts will be covered from Cleveland.

The Bay City Foundry & Machine Company, Bay City, Mich., manufacturers of coal conveyors, saw mill machinery and hoists, has purchased the business of the Howlett Construction Company, Moline, Ill., manufacturers and builders of the Williams, White & Co., coaling stations. W. E. Howlett, manager and engineer of the Howlett Construction Company, will be manager of the railroad coaling station department of the consolidated company. This consolidation will unite the engineering facilities of the two companies and enable them to manufacture their own machinery.

The Blaw-Knox Company has taken over the manufacture and field operation of the Uni-Form system of reinforced concrete floor and roof construction, and the Uni-Form system is now incorporated in the steel forms department of the Blaw-Knox Company and will be known as "Blawforms." Nils F. Ambursen, chief engineer of the Ambursen Hydraulic Construction Company, and the developer of the Ambursen dam, assumes the duties of chief engineer of the building form department of the Blaw-Knox Company, and W. L. Church, formerly of Westinghouse, Church, Kerr Company,

and Lockwood, Greene & Co., engineers, is retained as consulting engineer on the operation of the Uni-Form system.

The Haywood Company has opened offices in the Alaska Commercial building, San Francisco, Cal. The company will do an importing and exporting business, operating particularly in steel products, machinery, contractor and railroad equipment and engineering specialties. Mr. Haywood was formerly manager of the Pacific Car & Foundry Company, with headquarters at Portland, Ore.

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The Allied Machinery Company of America has increased its capital stock to \$5,000,000. This was made necessary by the decision of the American International Corporation to group all of its machinery export selling subsidiaries under one head. This move contemplates the complete absorption of the Allied Construction Machinery Corporation by the Allied Machinery Company of America. The Allied Machinery Company de France and the Allied Machinery Company d'Italia will retain their corporate entities, but their parent corporation will be the Allied Machinery Company of America rather than the American International Corporation as before. This is also true of the Horne Company, Ltd., of Japan, which was purchased early in the year by the American International Corporation.

PERSONAL

A. P. Van Schaick, district sales manager of the Lackawanna Steel Company at Chicago, has resigned to become special representative, with headquarters in Chicago, of the

American Chain Company, Inc., Bridgeport, Conn., effective May 15. Mr. Van Schaick began his business career in 1903, at which time he left Williams College, Williamstown, Mass., to enter the railroad sales department of the Pittsburgh Plate Glass Company, with headquarters in Chicago. From 1906 to 1910 he was in the employ of the Universal Railway Supply Company, with headquarters in the same city, resigning from that position during the later year to become district sales manager of the Lackawanna Steel Company at Chicago. Mr. Van Schaick has been active in the

work of railway supply organizations and especially of the National Railway Appliances Association. He was elected a member of the executive committee of this association in 1910, vice-president in 1911, and president the following year. He is still a member of the executive committee.

Allan E. Goodhue has been elected managing director of the English subsidiary of the Chicago Pneumatic Tool Company, the Consolidated Pneumatic Tool Company, Ltd., whose offices are at 170 Piccadilly, London, and whose plant is in Frasersburg, Scotland. Mr. Goodhue will also have charge of European sales for the Chicago Pneumatic Tool Company. He was for a number of years connected with the sales department of the Midvale Steel Company and Midvale

Steel & Ordnance Company in Philadelphia, Chicago and Boston, leaving that company in March, 1918, to enter the service of the government. From that time until January 1, 1919, when he became connected with the Chicago Pneumatic Tool Company, he was assistant manager of the Steel and Raw Material Section, Production Division, of the Emergency Fleet Corporation. Mr. Goodhue will sail for England May 13 on the Mauretania.

Frank E. Wade, president of the Fairmont Gas Engine & Railway Motor Car Company, Fairmont, Minn., and mayor of that city, died after a short illness at his home in Fairmont on March 3. He

was born at Whitehall, Wis., March 6, 1862, and received his education in the Curtis Business College at St. Paul, Minn. He received considerable engineering training under C. F. Loweth, now chief engineer of the Chicago, Milwaukee & St. Paul and entered the service of the G. W. Sherwood Company at St. Paul in 1881 as superintendent in charge of bridge construction. Later he was employed as general manager of Fairbanks, Morse & Co., and in 1902 left that company and became interested in mining properties in the Black Hills district of North Dakota.

In 1906 he returned to Fairmont and became connected with the Fairmont Gas Engine & Railway Motor Car Company several years later. Mr. Wade was also interested in many banking projects in the Northwest and in Florida and Mexico lands.

Charles Gilman, eastern manager of the Massey Concrete Products Corporation, with headquarters at New York, has been elected vice-president of that company with the same

headquarters. Mr. Gilman was born in 1882 at Cambridge, Mass., graduating from Harvard University in 1904. He began his practical training before graduation, the first concrete work with which he was connected being the construction of the Harvard stadium in 1903. The next two years he was engaged in work on the New York subway. In 1911 Mr. Gilman became identified with the concrete products business as assistant to the vice-president of the American Concrete Pile & Pipe Company. In 1912 this company was taken over by the C. F. Massey Company and he was appointed eastern engineer; the following year he was promoted to eastern manager, which position he has held until his recent election as vice-president.

John T. Dickerson, general manager of the Strauss Basculé Bridge Company, Chicago, died April 14 at his home, Oak Park, Ill., at 40 years of age. Mr. Dickerson was a graduate civil engineer of Rose Polytechnic Institute of Terre Haute, Ind., class of 1902. He had been identified with the Strauss Company for seven years. Prior to 1912 he was assistant engineer and general sales engineer with the Scherzer Roll-



Frank E. Wade



A. P. Van Schaick



Charles Gilman

ing Lift Bridge Company of Chicago for a period of 5 or 6 years, and before that he was employed in the bridge departments of the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, and the American Bridge Company of St. Louis, Mo.

Geo. W. Hoover, formerly in charge of the procurement of railway material in the construction division of the army, has been appointed manager of the newly opened St. Louis office of the Buda Company of Chicago.

Captain Charles S. Pillsbury, who was assistant sales manager of the Chicago Bridge & Iron Works, Chicago, prior to his entrance into military service, has been promoted to major and decorated with the French Legion of Honor. Major Pillsbury is in the construction division of the U. S. army overseas.

Frank J. Tone has been elected president of the Carborundum Company, Niagara Falls, N. Y., in place of **F. W. Haskell**, deceased, and **George R. Rayner**, secretary, has been elected vice-president in place of **R. B. Mellon** of Pittsburgh. **F. H. Manley** retains the office of treasurer. Mr. Tone was formerly works manager, having been in charge of manufacturing operations since the establishment of the works at Niagara Falls in 1895. He was previously engaged in electric railway work in Pittsburgh. He is well known for his work in the electric furnace field on artificial abrasives, refractories and silicon alloys and is past president of the American Electrochemical Society. Mr. Tone is a graduate of Cornell University. Mr. Rayner, the new vice-president, was born in Springfield, Mass. He served for a period of time as a member of the sales force of the Hampden Wheel Company, and in June, 1898, he was appointed manager of the Chicago branch of the Carborundum Company. In August of the same year he was transferred to the general offices at Niagara Falls in order to assume his duties of the secretary and the general sales manager of the company. Mr. Rayner is a past president of the American Foundry & Supply Association. He has also been a member of the board of directors of the Chamber of Commerce at Niagara Falls.

Lewis A. Nichols, consulting engineer and president of the Chicago Steel Tape Company, Chicago, died on March 5 at his home in Chicago. He was born on August 26, 1851, in Florence, Italy, of American parents, and came to this country in July, 1857, settling in Danvers, Mass. In 1871 he graduated from the Massachusetts Agricultural College at Amherst, and later during the same year was engaged in laying out an addition to the city of Fall River, Mass., after which he was employer as leveler in a locating party on the Massachusetts Central. In the spring of the next year he was given charge of the locating party, finishing the construction of a division of that railroad in the fall of 1873. Two years

he was elected city engineer of Chelsea, Mass., from which position he resigned in 1877 to engage in railroad surveys and construction work in many parts of this country and Mexico. In 1908 he discontinued active service in his profession except as a consulting engineer and has since devoted the greater part of his time to the interests of the Chicago Steel Tape Company.

Earl Wheeler, O. A. Mechlin and Frank Rhea announce their association in the firm of Wheeler, Mechlin & Rhea as advisory and purchasing engineers with office at 90 West street, New York. The purpose of this firm is to conduct an advisory and purchasing engineering business, organized to furnish service to foreign and domestic clients purchasing machinery and engineering materials in the United States, to be used to construct, maintain and operate properties. Or in other words those classes of materials, equipment, apparatus and supplies which require engineering specifications or plans as a fundamental basis of purchase. In addition the firm will arrange co-ordinated production programs for shipments from one or several manufacturing plants, and follow production schedules at the factories by a follow up system of correspondence and personal visits, supervising inspection, packing and shipments by rail and water. The compensation of the firm will be derived from fees from clients served.

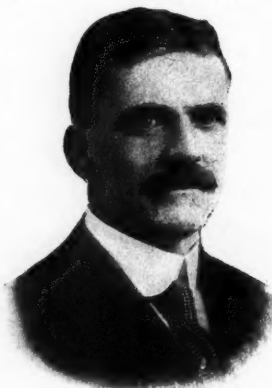
Mr. Rhea has had extended railway experience, having served at one time assistant supervisor and supervisor of track on the Norfolk & Western, later serving on the Pennsylvania as chief signal inspector, assistant engineer and division engineer, respectively. He has also been employed as apprentice with the Union Switch & Signal Company, superintendent of construction of the Clamond Telephone Company and commercial engineer in the railway engineering department of the General Electric Company. He later served as district engineer of the Eastern district, Division of Valuation, Interstate Commerce Commission. More recently, as a commercial engineer of the Bureau of Foreign and Domestic Commerce, he made a study of the markets for railway materials in New Zealand, Australia, the Philippine islands, China and Japan.

Mr. Wheeler has served as director of the department of electrical and mechanical engineering, engineer school, Corps of Engineers, United States Army; as treasurer and general manager of the Electric Speedometer Company, Washington, D. C., and as local manager of the General Electric Company at Washington, D. C. He has had the rank of lieutenant-colonel of engineers, United States Army, and acted as chief of the machinery and engineering materials division, office of the Director of Purchase, General Staff.

Mr. Mechlin is a member of the firm of Mechlin & Starr, architectural engineers, Washington, D. C. He served as



Frank J. Tone



G. R. Rayner



Frank Rhea



Earl Wheeler

lieutenant-commander, Civil Engineers corps, United States Navy, and was the officer in charge of construction of the additions to the Naval Academy; the Navy and Munitions building, Washington, D. C. (the largest concrete-steel office building in the world); and was public works officer, Navy Yard, Philadelphia, Pa., in charge of construction of shops, buildings, wharves, power plant, dry dock and ship building ways.

James Viles, chairman of the board of directors of the Buda Company, Chicago, died on April 27, at Chicago. He was born in Boston, Mass., on March 10, 1855, and received



James Viles

chairman of the board of directors.

E. R. Lewis, chief engineer of the Duluth, South Shore & Atlantic, with headquarters at Duluth, Minn., has resigned from that position to become associated with the editorial



E. R. Lewis

department of the Simmons-Boardman Publishing Company as an editor of the *Maintenance of Way Cyclopedia*. Mr. Lewis was born on November 20, 1869, at Raritan, N. J., and graduated from the University of Iowa in 1890. He began railway work in 1885 with the Missouri Pacific, with which road he was consecutively axman and rodman on construction, levelman, clerk in the timber department, levelman on bridge location and from 1891 to 1892 division engineer. He was reclamation engineer in Wyoming from 1893 to 1895, and was then for two years division engineer on the United States Government levees on the Mississippi river improvement work. From 1897 to 1901 and again from 1903 to 1905, he was with the state government railways in South Africa, first as locating engineer in Cape Colony, and during the last year as district engineer of maintenance at Mafeking and Port Elizabeth. During 1901 and 1902 he was engineer in charge of construction on the White River division of the Missouri-Pacific at Batesville, Ark., and division engineer on location and construction of the Fort Smith & Western in Oklahoma. He was made assistant engineer of the Keweenaw Central in 1905 and from August, 1906, to June, 1912, he was division engineer of the Michigan Central at Bay City, Mich. In July, 1912, he was appointed assistant to the general manager

of the Duluth, South Shore & Atlantic, with headquarters at Duluth, Minn., and when this road was taken over by the government he was made chief engineer, which position he held until his association with the Simmons-Boardman Publishing Company.

E. Roy Borden has been appointed service engineer of Mudge & Co., in which capacity he will be in charge of investigating service given by the products manufactured by



E. Roy Borden

that firm and their successful handling, care and operation. Mr. Borden was born at Galveston, Tex., on January 17, 1893, and studied three years at Purdue University, Lafayette, Ind., after which he entered the service of the Pennsylvania at Fort Wayne, Ind., as a special apprentice in the shops of that road. The following year he returned to Purdue University, graduating from that institution as a mechanical engineer in June, 1915. In the fall of the same year he entered the employ of the Atchison, Topeka & Santa Fe in the test department, where he remained until December, 1917, at which

date he was commissioned a second lieutenant in the ordnance department of the United States army and sent to France. On February 13, 1919, he received his honorable discharge from the army and returned to his former position with the Atchison, Topeka & Santa Fe, which he held until his appointment as service engineer of Mudge & Co.

Frank H. DeBrun has been appointed mechanical engineer in charge of design and improvement for Mudge & Co., Chicago, effective May 15. Mr. DeBrun was born in Switzerland



Frank H. De Brun

land in 1883 and received his education in the Higher Polytechnic University of Geneva. Following his graduation he served three years as an apprentice in mechanical and electrical laboratories in Switzerland and the following two years as a mechanical draftsman for the Coventry Motor Works, Ltd., at Coventry, England. The next seven years he was employed by the Royal Automobile Club of London as superintendent in charge of garage and repairs, resigning from that position to come to the United States as manager of the Universal Auto Training School in New York City.

In the fall of 1917 Mr. De Brun became associated with the Detroit Institute of Technology, where he had charge of the automobile engineering laboratories works, electrical equipment and battery works and special courses in the maintenance and repair of tractors.

Paul H. Schatzmann, foreign representative of the Joseph T. Ryerson & Son Company, sailed for Rio de Janeiro, Brazil, April 10, to take charge of the company's interests in Brazil, Argentina and Peru temporarily. In August Mr. Schatzmann will sail for Europe, thence to India, China and Japan. **A. L. G. Gentles** will establish headquarters in Lon-

don to take care of the interests of this firm in Great Britain and Scandinavia and will leave the United States in May.

L. M. Sawyer, vice-president of the Chicago Steel Tape Company, Chicago, has been elected president, succeeding Lewis A. Nichols, deceased.

P. E. Longstreet has been appointed resident manager of the Western district of the Massey Concrete Products Corporation of Chicago, with headquarters at Salt Lake City, Utah.

Vernon T. Brauns, manager of the railroad valuation department of the American Blue Print Company, Chicago, was promoted to general manager of all departments for this company, effective May 8.

The United States Switch Company, Eau Claire, Wis., has let contracts for the erection of additions to its iron and steel foundry and machine shops and work is now under way on the new buildings.

H. M. Davison, for the past 14 years connected with the sales organization of the Hayward Company, has left that company to become sales manager of the Ohio Locomotive Crane Company, Bucyrus, Ohio.

Mudge & Co., Chicago, has awarded contracts for the erection of a one-story factory, 190 ft. by 194 ft., at West 16th street, Chicago. The superstructure of the new building will be of steel and brick. It will cost approximately \$75,000.

T. J. Hudson of the Chicago Pneumatic Tool Company has been appointed acting manager of the pneumatic tool sales division, effective April 15, succeeding **F. H. Waldron**, who returns to Minneapolis, Minn., as district manager of sales for the Minneapolis territory.

Donald M. Ryerson, who has been in the United States navy for the past two years, has received his discharge from the service and returned to his duties as vice-president in charge of purchases and sales of the Joseph T. Ryerson & Son Company, Chicago.

S. Gordon Hyde, who recently received his honorable discharge from service, has been appointed advertising manager of the Buda Company, Chicago, with headquarters at Harvey, Ill., to succeed **C. O. Powell**, who has accepted the position of assistant commissioner with the Association of Metal Lathe Manufacturers, Chicago.

Edwin R. Webster, until recently assistant engineer on the Iowa, Dubuque, Des Moines and Dakota divisions of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has taken up private practice in general, civil, sanitary and structural engineering, with office in the Webster building, Chicago.

F. X. Meehan has been appointed advertising manager of the Walter A. Zelnicker Supply Company, St. Louis, Mo. Mr. Meehan was associated in various executive capacities with Fairbanks Morse & Co., for six years; the Atchison, Topeka & Santa Fe Railroad, Coast Lines, for two years and the St. Louis Smelting & Refining Works of the National Lead Company for two years.

J. E. Mason has been appointed manager of field sales of the Blaw-Knox Company, Pittsburgh, Pa., with offices at Pittsburgh. In this capacity Mr. Mason will supervise the operation of a sales agency plan throughout the country. Mr. Mason is a graduate of Purdue University and for the past four years has been in the employ of the McGraw-Hill Publishing Company, Inc., New York.

Judge S. E. DeHaven, LaGrange, Ky., has resigned as county judge of the fiscal court of Oldham county to become traveling salesman in Kentucky of the Canton Culvert & Silo Company, Canton, Ohio, and **L. W. Hurley** of Lansing, Mich., has joined the sales force of the same company as Michigan culvert salesman.

TRADE PUBLICATIONS

Small Tools.—Catalog No. 40, listing taps, dies, screw plates and reamers manufactured by the Greenfield Tap & Die Corporation, Greenfield, Mass., has been issued by this company. It contains 288 pages in which sizes, prices, dimensions and illustrations are given in convenient form.

Rails and Accessories.—The Walter A. Zelnicker Supply Company St. Louis, has issued a leaflet in the form of a bill of material available in its warehouses. This covers rails and fastenings, crossings, frogs, switch stands, switches, ties, rail braces, spikes and tie plate.

Crossing Frog Costs.—The International Steel Tie Company, Cleveland, Ohio, has issued a folder describing the crossing foundations manufactured by that company, giving a list of railroads which have used these foundations and an exposition on the economies of this form of construction.

Track Material.—The Illinois Steel Company, Chicago, has issued an attractive book of 48 pages of specifications, photographs and dimensions of track spikes, ordinary and open hearth, oil quenched track bolts and screw spikes. This book contains many data of use to those engaged in the ordering, handling or using of track materials.

Steam Mine Hoists.—The Lidgerwood Manufacturing Company, New York, has issued bulletin No. 19 containing 32 pages descriptive of the line of steam mine hoists manufactured by that company. Two pages are devoted to general specifications and all of the others to illustrations, descriptions and tables of sizes, weights and dimensions of individual types of this equipment.

Welding Rods and Wire.—The Page Steel & Wire Company, New York, has published a small booklet containing information on oxy-acetylene and electric welding material and descriptions of methods of manufacture of Armco iron rods illustrated with microphotographs. Illustrated data in tabular form on weights and thicknesses of metals to be welded is also contained therein.

Steam Pumps.—The A. S. Cameron Steam Pump Works, New York, has issued several bulletins describing the equipment manufactured by this company with a manila folder to bind them together. Among recent issues are several describing the Cameron steam piston and plunger pumps, single suction centrifugal pumps, two-stage motor driven and three-stage turbine driven centrifugal pumps and other special equipment.

Tie Plates.—The Illinois Steel Company, Chicago, has issued an 80-page booklet showing the dimensions and designs of the standard sizes of tie plates rolled by that company. In addition to showing over 50 designs of plates, the book contains information concerning the widths of rail bases of various sections of rails and presents the information required with orders for tie plates.

Cableways.—The Lidgerwood Manufacturing Company, New York, has issued a 10-page booklet describing its various types of cableways and transfers for storing and reclaiming coal and handling ashes and similar materials. These include the stationary cableway, the traveling cableway, the radical cableway and Lidgerwood transfer. All of these types are illustrated by means of diagrams showing clearly the character of work performed by each type. Three pages of the booklet are devoted to descriptions and photographs of particular installations.

Explosives.—E. I. du Pont de Nemours & Co., Wilmington, Del., manufacturers of explosives, has issued an eight-page booklet on the use of explosives in blasting concrete. It describes in detail new and economical methods of removing old walls, breaking up engine beds and excavating concrete foundations. One page is devoted to short descriptions of the actual application of explosives to work of this character and the illustrations show in a graphic way the contrast between the old and new methods.

History of Rail Manufacture.—Robert W. Hunt, president of Robert W. Hunt & Co., Chicago, has prepared and distributed a booklet outlining in detail the early development of Bessemer rail manufacture. The book contains a paper entitled "The History of the Bessemer manufacture in America," which was presented at the American Institute of Mining Engineers at its centennial meeting held in Philadelphia on June 23, 1876, and one entitled "The Evolution of American Rolling Mills," which was presented as a presidential address before the American Society of Mechanical Engineers on November 16, 1891. These papers contain much information not commonly known regarding the early development of Bessemer rail manufacture.

